Specifications

Downtown Glenwood Springs 7th Street Landscaping

Shannon Murphy Landscape Architects
1-25-19
Revised 3-21-19

Project Manager
DDA Representative
Presently Deric Walter, Boundaries Unlimited
970.945.5252

Landscape Architect
Shannon Murphy Landscape Architects
970.927.2889

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

The CONTRACTOR shall submit to the PROJECT MANAGER for approval all submittals required by the General Conditions and these Specification sections.

1.02 INSURANCE CERTIFICATES

Refer to General Conditions for submittal requirements. Submit updated certificates as necessary to verify current coverage.

1.03 SCHEDULE OF VALUES

Refer to General Conditions for requirements. On bid items to be paid as lump sum that may extend beyond a single pay estimate, a schedule of values shall be submitted to OWNER a minimum of 10 days prior to work on that item. Adequate detail shall be given to allow a value to be placed on work completed during any given pay estimate. Where payment is to be based on unit bid prices, correlate schedule of values with Divisions and Sections of Specifications unless otherwise approved by the PROJECT MANAGER. If separate payment is to be requested for materials suitably stored but not installed, segregate delivered costs from installation costs, including overhead and profit.

1.04 CONSTRUCTION SCHEDULE

(See Section 01310 for Construction Schedule Submittal details).

1.05 SHOP DRAWINGS

(See Section 01340 for Shop Drawing Submittal details).

1.06 PROJECT RECORD DOCUMENTS

(See Section 01700, Project Acceptance, for project record document details).

END OF SECTION

Submittal Description: _____ Submittal No.: _____

Spec. Section: _____

	Routing	Date Sent	Date Received
OWNER:	Contractor/Project Manager		
PROJECT:	Project Manager/Contractor		
CONTRACTOR:			

We are sending you:
- ☐ Attached
- ☐ Under separate cover via _____
- ☐ Submittals for review and comment
- ☐ Product data for information only

Remarks: _____

Item	Copies	Date	Section No.	Description	Review action [a]	Reviewer initials	Review comments attached

[a] **Note: NET = No exceptions taken; MCN = Make corrections noted; A&R = Amend and resubmit; R = Rejected, Develop Replacement**

Attach additional sheets if necessary.

Contractor

Certify either A or B:

☐ A. We have verified that the material or equipment contained in this submittal meets all the requirements, including coordination with all related work, specified (no exceptions).

☐ B. We have verified that the material or equipment contained in this submittal meets all the requirements specified except for the attached deviations.

No. Deviation

_____

_____

Certified by: _____

Contractor's Signature

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1

1.01 GENERAL

A. Permitted working hours. City of Glenwood Code Section 100.070.030 - Noises prohibited.

The following noises are declared a nuisance and are in violation of this section: (1) Construction work. Any noise created by operating or causing to be operated any equipment (mechanical or nonmechanical, self-propelled or manually manipulated) used in construction, repair, alteration or demolition work on buildings, structures, streets, alleys or appurtenances at any time other than between the hours of 7:00 a.m. and 8:00 p.m. on Monday through Friday, and 8:00 a.m. and 6:00 p.m. on Saturday and Sunday.

B. Within ten (10) days after EFFECTIVE DATE OF AGREEMENT or by the pre-construction conference, the CONTRACTOR shall prepare and submit to the PROJECT MANAGER estimated construction progress schedules for the Work, with sub-schedules of related activities which are essential to the progress of the Work. Project to start after Gould Construction completes current project on 7th Street in this area. Confirm proposed start date with Project Manager.

C. Submit revised progress schedules as follows:

1. Weekly: Submit a two week schedule depicting items of work and general locations for the two weeks succeeding the date of submittal. Needs from Owner (submittal reviews, construction staking, etc) shall be included. This may be in the form of a spreadsheet and shall contain adequate detail to provide clear vision to all of the intended work. The Resident Project Representative shall be notified of variations from this schedule as soon as known and no later than the morning of the effected change.

2. Monthly: With each progress payment request, submit an updated progress schedule as detailed herein. Failure to submit this updated progress schedule or providing a progress schedule that does not represent the true status of the project as determined by the Owner, shall be grounds for a determination that no further progress payments are to be made until Contractor is in full compliance with this section.

C. OWNER may require CONTRACTOR to add to his plant, equipment or construction forces, as well as increase the working hours, if operations fall behind schedule at any time during the construction period.

D. Related Requirements Specified Elsewhere.

1. General Conditions.
2. Supplemental General Conditions.

3. Standard Specifications.

1.02 FORM OF SCHEDULES

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide separate horizontal bar for each trade or operation.
2. Horizontal time scale: Identify the first work day of each week.
3. Scale and spacing: To allow space for notations and future revisions.
4. Maximum sheet size: 11" x 17".

B. Computer generated schedule.

Network analysis system may be utilized in lieu of bar chart.

C. Format of Listings.

The chronological order of the start of each item of work.

1.03 CONTENT OF SCHEDULES

A. Construction Progress Schedules to include:

1. The complete sequence of construction by activity.

2. The dates for the beginning, and completion of, each major element in each major area of construction,

3. Projected percentage of completion for each item, as of the date on which each scheduled Application for Payment is due.

4. Complete projected progress payment schedule.

B. Schedule of Submittals for Shop Drawings and Product Data to include:

1. The dates for CONTRACTOR's submittals.
2. The dates approved submittals will be required from the PROJECT MANAGER.
   Extensions of time for delays in submittal review and distribution will only be allowed as provided for in Section 01340.

C. Products Delivery Schedule.

Show delivery dates for all major items of material and equipment.

1.04 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule.

1. Major changes in scope.
2. Activities modified since previous submission.
3. Revised projections of progress and completion.
4. Revisions to projected progress payment schedule.
5. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.
2. Corrective action recommended and its effect.

1.05 SUBMISSIONS

A. Submit initial schedules within ten (10) days after effective date of Agreement.

1. PROJECT MANAGER will review Schedules and return review copy within ten (10) days after receipt.

2. If required, resubmit within seven (7) days after return of review copy.

B. Submit revised progress schedules with each Application for Payment.

C. Number of copies required at each submission:

1. The number of opaque reproductions required by the CONTRACTOR plus four (4) copies which will be retained or distributed by the PROJECT MANAGER.
2. Do not submit fewer than five (5) copies.

1.06 DISTRIBUTION

A. After review, PROJECT MANAGER will distribute copies of schedules to:

1. One (1) copy to OWNER.
2. One (1) copy to Resident Project Representative.
3. One (1) copy to the Town Public Works Manager
4. One (1) copy to be retained in PROJECT MANAGER's file.
5. One (1) copy to CONTRACTOR to be kept on file at CONTRACTOR's field office.
6. Remainder to CONTRACTOR for his distribution following modifications if required.

B. Schedule recipients will report promptly to PROJECT MANAGER and CONTRACTOR, in writing, any problems anticipated by the projections shown on the schedules.

END OF SECTION

SECTION 01315

MAINTENANCE

MAINTENNANCE PROPOSAL

Proposal to include:

- Recommendation for landscape maintenance
- The frequency of on-site crew visits
- Duties to be performed at each visit
- The price for one year of maintenance

To be submitted in addition to the bid sheet.

END OF SECTION

SECTION 01320

PRODUCT DELIVERY, STORAGE AND HANDLING

PART 1 – GENERAL

1.01 RELATED REQUIREMENTS

A. General and Supplementary Conditions

1.02 PRODUCTS

A. Products include material, equipment and systems. Comply with Specifications and referenced standards as minimum requirements.

1.03 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

1.04 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

C. Store loose granular materials on solid surfaces in a well drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and are maintained under required conditions.

E. Staging of delivery vehicles and offloading materials to be conducted with least possible interference to vehicular traffic. Contractor to include specifications for handling delivery vehicles in Traffic Control Plan to be submitted to the Project Manager.

F. The contractor may work with Gould Construction to use the current staging area at the City of Glenwood Springs Water Treatment Facility parking lot at the

intersection of 7th. St. and 8Th Street. Approximately 3 blocks west of construction site. If Gould's contract is complete, the use of the staging area adjacent to the WWTP will require an agreement with the City to continue use.

G. Overnight and multiple day materials storage during project construction to occur within project area. Contractor to build temporary materials staging area within the project boundary.

H. Green plastic fencing to be installed between the project work area and pedestrian walkways and vehicle traffic lanes to provide safety and secure the project site. Fencing to be maintained in an aesthetically pleasing fashion, and remain in place for duration of project.

Example of green plastic fencing for temporary staging area.
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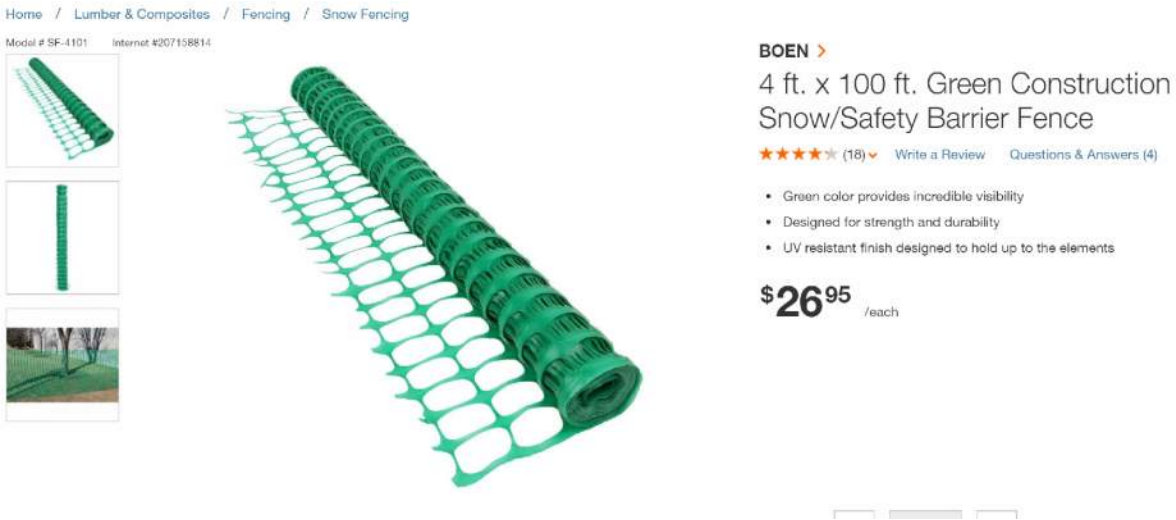


END OF SECTION

SECTION 01340

SHOP DRAWINGS

PART 1 GENERAL

1.01 REQUIREMENTS INCLUDED

A. The CONTRACTOR shall submit to the PROJECT MANAGER for approval all shop drawings required by the specification sections and PLANS.

1.02 SHOP DRAWINGS

A. Shop drawings shall be prepared by a qualified detailer for CONTRACTOR, subcontractor, supplier, or manufacturer, and shall illustrate some portion of the work, showing fabrication, layout, setting, or erection details.

B. Identify details by reference to sheet and detail numbers shown on Contract Drawings. Use same symbols used on Contract Drawings to identify shop drawing details wherever practicable.

1.03 PRODUCT DATA

A. Submit manufacturer's standard schematic drawings:

1. Modify drawings to delete information that is not applicable to the project.

2. Supplement standard information to provide additional information applicable to project.

B. Submit manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.

1. Clearly mark each copy to identify pertinent materials, products or models.

2. Show dimensions and clearances required, performance characteristics and capabilities, wiring diagrams and controls, and any other pertinent data applicable to the project.

C. Submit manufacturer's certificate of compliance certifying to compliance with specification requirements, applicable reference standards and test data requirements. Include reference to the specification section and paragraph with which the product or materials is intended to comply.

1.04 CONTRACTOR RESPONSIBILITIES

A. CONTRACTOR shall submit shop drawings in electronic PDF format.

B. Submittals shall be made by CONTRACTOR to the PROJECT MANAGER with a transmittal form or letter and not by subcontractors, suppliers or manufacturers. CONTRACTOR shall review, stamp with his approval, and submit in orderly sequence all submittals required by the specifications. By approving and submitting items, CONTRACTOR represents that he has verified all field measurements, field construction criteria, materials, catalog numbers, and similar data, and has coordinated each shop drawing with requirements of the project.

C. The CONTRACTOR shall not begin work that requires submittals until the PROJECT MANAGER reviews and approves submittals. The PROJECT MANAGER will return an approved copy of the submittal to the CONTRACTOR.

D. CONTRACTOR'S responsibility for errors and omissions in submittals, or for deviations in submittals from requirements of the Contract Documents, shall not be relieved by review of submittals unless PROJECT MANAGER gives written acceptance of specific deviations. The CONTRACTOR shall notify PROJECT MANAGER in writing at time of submission of deviations in submittals from requirements of the Contract Documents.

END OF SECTION

SECTION 01570

TRAFFIC CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. Contractor to minimize impact to vehicular and pedestrian traffic in and near project site. Potential methods include: utilizing small crews that work within a defined “work zone” until that zone is completed. Working from within the small “work zones” and closing off small sections of the road shoulder to create a safety buffer between workers and vehicles. Shuttling materials into the “work zones” during low traffic periods.

B. This work shall consist of furnishing, installing, moving, maintaining and removing temporary traffic signs, advance warning signs, barricades, channelizing devices, delineators, and flagmen as required by the latest revision of the "Manual on Uniform Traffic Control Devices for Streets and Highways" and the latest revisions of the Colorado Supplement thereto, in accordance with the Drawings and these Specifications.

C. Where the contractor's work requires either partial or complete closure of any public street, road, highway, alley or sidewalk, the contractor shall submit a Traffic Control Plan to the City of Glenwood Springs for approval prior to starting project. If the City of Glenwood Springs approves the complete closure of an arterial or collector street, the Traffic Control Plan shall be submitted 7 days in advance of the actual closure, so that there will be sufficient time for public notification. The contractor shall notify the City of Glenwood Springs Police Dispatcher and Fire Protection District 48 hours prior to the time the closure is to begin and again when the street is reopened.

D. Where the control and maintenance of traffic has not been performed as specified in the Special Conditions and/or the Contractor does not provide or conform to the devices and methods in the latest Manual on Uniform Traffic Control Devices (MUTCD) and the latest revisions of the Colorado Supplement thereto adopted by the City, the City Engineer may act to provide for the control and maintenance of traffic as directed by the City. All costs incurred by the City shall be borne by the contractor. The City Engineer may issue a Stop Work order to the Contractor until traffic control is in conformance to these specifications.

E.

1.02 REFERENCE STANDARDS.

A. Federal Highway Administration; Manual on Uniform Traffic Control Devices.

B. Colorado Department of Transportation, Standard Plans, S-Standards, current version.

1.03 SUBMITTALS

A. Review, by Project Manager or Owner, of the Contractor's Traffic Control Plan (TCP) and Methods of Handling Traffic (MHT's) in no way limits or removes from the Contractor the full responsibility for the safe and effective handling of traffic both vehicular and pedestrian through or around the Project.

B. Traffic Control Plan (TCP). Traffic control, both vehicular and pedestrian, through the construction area is the responsibility of the Contractor. The Contractor shall prepare a TCP to be submitted with the return of the signed agreement. The TCP shall include a schedule of traffic control devices to be used on the Project, general layout of devices, situations that may require use of flaggers and/or pilot cars, and methods of notifying public of impending traffic changes. The Project Manager or Owner will review the TCP for general coordination of the Project.

C. Methods of Handling Traffic (MHT). The Contractor shall control traffic in accordance with the Traffic Control Plan (TCP). To implement the TCP, the Contractor shall develop and submit a method for handling traffic (MHT) for each different phase of construction, which shows the Contractor's proposed construction phasing and proposed traffic control devices consistent with the TCP. If at any time the Contractor desires to change the MHT, it shall be considered a different phase requiring a new MHT.

D. Each MHT shall be submitted to the Project Manager/Owner before the corresponding phase of construction will be allowed to begin. The initial MHT shall be submitted a minimum of 10 days prior to the start of work on the Project. All successive MHT's shall be submitted to allow reasonable time for review. MHT's for work in the City of Glenwood Springs rights-of-ways shall be submitted a minimum of thirty (30) days prior to commencement of related work.

E. The Contractor shall continually review their methods of handling traffic. If revisions are needed for the safe movement of traffic through or around the work areas, the Contractor shall implement the revisions immediately. The Contractor shall notify the Project Manager/Owner of all changes made.

PART 2 PRODUCTS

2.01 GENERAL

A. All materials shall conform to the applicable portions of the Reference Standards.
B. No access from Railroad side of project. Keep railroad stairs and platform clear at all times.

2.02 BARRICADES

A. Minimum 8' wide on movable skids.

2.03 DETOURS

A. As required by the Project.

2.04 ROAD RESTRICTIONS

A. As required by the Project.

2.05 FLAGPERSONS

A. Certified flagpersons only. Provide as needed, as directed by Project Manager or as stated on Drawings to control traffic encroaching in construction zone.

2.06 BARRICADES, CHANNELIZING DEVISES, FLASHING WARNING LIGHTS

A. Provide for all work areas, open trenches, lane closures, equipment and material storage, etc., and as called for on the Drawings and located within limits of construction. Protection to be in place 24 hours per day and device inspection shall be seven days per week.

2.07 TRAFFIC CONTROL MANAGEMENT

A. Provided by a certified Traffic Control Supervisor (TCS) on a 24-hours-per-day basis. An after-hours contact shall be provided for every calendar day from the first placement of traffic control devices until all devices are removed. Any changes to this contact shall be submitted to the Project Manager and to Dispatch Services.

PART 3 MEASUREMENT AND BASIS OF PAYMENT

3.01 Work under this item shall be paid for as lump sum. Work shall include Contractor development of the TCP; placement and maintenance of traffic control devices; other devices as needed to protect and secure the work area; flag persons; traffic control management and inspection; and other items not specifically stated that are essential to the safe movement of vehicular and pedestrian traffic through and around the work area.

3.02 Where items are specifically included on the bid schedule, they will be paid for by the unit given. All other items in this section that are essential to the Project but for which there are no specific pay items, will not be measured and paid for separately but shall be included in the Project.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SUMMARY

A. Work to be performed under this section shall include all labor, equipment, materials and miscellaneous items necessary to provide all documents, information and items as specified herein.

1.02 PROJECT RECORD DOCUMENTS.

A. Maintain at the job site one record copy of the following (updated daily):

1. Drawings.
2. Specifications.
3. Addenda.
4. Reviewed Shop Drawings.
5. Change Orders.
6. Other Modifications to Contract.
7. Field Test Records.

B. Do not use record documents for construction purposes. Maintain documents in clean, dry legible condition, apart from documents used for construction.

C. Label each document "Record Document". Mark all information with contrasting color using ink. Keep each record current. Do not permanently conceal any work until required information is recorded.

D. Record following information on Drawings:

1. Northing and Easting coordinates for all building corners and all buried pipes and utilities (at ends, changes in alignment, fittings and valves). Coordinates shall be in the project coordinate system.

2. Building Locations and depth of foundation elements.

3. Horizontal and vertical location of underground utilities.

4. Location of internal utilities and appurtenances concealed in construction.

5. Structural, architectural, mechanical and electrical installations.

6. Field changes of dimension and detail.

7. Changes by Change Order or field order.

8. Details not on original Contract Drawings.

E. Record following information on Specifications:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.

2. Changes by change order or field order.

3. Other matters not originally specified.

F. Maintain Shop Drawings as record documents recording changes made after review as specified for Drawings above.

G. At completion of project, deliver record documents to Project Manager with transmittal letter containing date, project title and number, contractor's name and address, title and number of each record document, and certification that each document is complete and accurate. Submittal shall be signed by Contractor or his authorized representative.

1.03 CLOSEOUT PROCEDURES.

A. The following project closeout procedure defines the responsibilities of the Contractor, Owner and Project Manager in closing the project. Closeout may be conducted by areas or portions of the work if required by the project or requested by Owner.

1. Step 1: Contractor advises Project Manager in writing that he has reached "Substantial Completion" and provides a list of items to be completed or corrected.
   a. Completion of all testing and training required.
   b. Have all utilities connected and operational.
   c. Dismantled and removed temporary construction facilities.
   d. Completion of Plant Startup and diversion of sewage to the new facility as shown and/or specified.

2. Step 2: Project Manager inspects the work to determine if it is substantially complete and issues a Certification of Substantial Completion plus a "punch list" of items to be completed or corrected.

3. Step 3: Contractor completes and/or corrects all punch list items and notifies in writing that his work is ready for final inspection. At this time, a final application for payment is submitted to the Project Manager.
   a. Project Manager’s and Contractor’s punch list of deficiencies from the substantial completion inspection stating how each item has been corrected or otherwise resolved.
   b. Submit a final meter reading for all utilities, a measured record of stored fuel and chemicals and similar data as of the time of final inspection.
   c. Complete listing of all consumables and spare parts used by the contractor to service the elector-mechanical equipment after testing.
   d. Submittal of Record Drawings.
   e. Notify the Project Manager that the facility is ready for the final

inspection including the punch list items and that all marred or damaged finishes have been repaired or restored in the notification letter.

4. Step 4: Project Manager makes final inspection. When the Work is found to be acceptable under the Contract Documents, and the contract fully performed, Project Manager will issue a final Certificate of Payment.

1.04 RE-INSPECTION FEES

A. Should the Contractor fail to complete and/or correct all punch list items such that additional inspections are required by the Project Manager, the Contractor will be billed at the Project Manager's current rate for additional services. If the Contractor has any question with regard to any items on the punch list, he is to request clarification before final inspection.

1.05 FINAL PAPERWORK

A. Prior to release of final payment, the General Contractor shall deliver the following items to the Project Manager:

1. Inspection Certificates, as applicable.
2. Equipment and material guarantees/warranties.
3. General Contractor's two-year guarantee of materials and workmanship.
4. Materials and Equipment Manuals and Spare Parts as specified.
5. All other guarantees, warranties and submittals, as specified.
6. Receipts for extra materials delivered to the Owner.
7. Make final change-over of locks and deliver keys.
8. Final application for payment.
9. Contractor's affidavit of release of liens (Spec. Section 00691 or AIA Form G706A).
10. Consent of surety to final payment (Spec. Section 00692 or AIA Form G707).
11. Final Project Record Documents. The purpose of final project record documents is to provide factual information regarding all aspects of work, both concealed and visible, to enable future modification of work to proceed without lengthy and expensive sire measurement, investigation, and examination.
    a. Transfer of Data to Drawings
        i. Carefully transfer all data to a clean set of drawings, coordinating changes as required.
        ii. Clearly indicate at each affected detail and other drawing, a full description of changes made during construction, and the actual location of items to be located.
        iii. Call attention to each entry by drawing a “cloud” around the area/s affected.
        iv. Make changes neatly, consistently, and with the proper media to assure longevity and legibility.
    b. Transfer of Data to other Documents
        i. If documents other than drawings have been kept clean during progress of work, and if entries thereon have been orderly and acceptable to the Project Manager, the job set

of those documents other than drawings will be accepted as final record documents.

ii. If any such document is not acceptable to the Project Manager, secure a new copy of that document from the Project Manager at Project Manager's usual charge for reproduction and handling, and carefully transfer the changed data to the new copy for acceptance by the Project Manager.

c. Changes subsequent to acceptance

i. Contractor has no responsibility for recording changes in work subsequent to final completion, except for changes resulting from warranty work.

12. Contractor acknowledgement of Date of Substantial Completion.

13. Provide copy of all certificates and approvals required from outside agencies, i.e. State Electrical Board.

14. The above items are described in following articles or applicable sections of the Specifications.

15. Inspection Certificates. Each subcontractor shall, upon completion of the Work, secure in triplicate from any state or local governing bodies having jurisdiction in dictating that the Work is in strict accordance with the applicable codes and deliver the same to the General Contractor for transmittal to the Owner.

1.06 WARRANTY

A. The General Contractor and each subcontractor shall remedy any defects due to faulty materials or workmanship and pay for any damage to other Work resulting therefore, which shall appear in his Work within the specified Warranty Period of 1 year. The Contractor's warranty shall begin upon issuance of the Notice of Acceptance and in accordance with the terms of any special warranties provided in the Contract. The Owner shall give notice of observed defects with reasonable promptness.

B. A final warranty inspection will be required thirty (30) days prior to expiration of the warranty.

C. Upon completion of his Work, the General Contractor shall deliver to the Project Manager in duplicate, a written warranty based on the provision of the Article properly signed and notarized. Warranty shall be address to the Owner and assembled in a binder with a durable plastic cover and with a table of contents.

D. The warranty period shall begin upon acceptance by Owner with written Notice of Substantial Completion.

E. In the event that multiple or phased system startups are required, warranty periods will begin upon acceptance by Owner with written Notice of Substantial Completion for each system after successful startup of the complete system.

F. Equipment warranties shall be the greater of the manufacturer's standard warranty and the project warranty requirement stated in the Supplemental General Conditions.

1.07 MISCELLANEOUS KEYS, SWITCHES AND WRENCHES

A. At the completion of the project, all loose keys for hose bibs, adjustment keys and wrenches for door closers and panic hardware, keys of electric switches, electrical panels, etc., shall be accounted for and turned over to the General Contractor for transmittal to the Owner.

1.08 SPARE PARTS

A. The contractor shall provide all spare parts and products as specified in the technical specifications. Contractor shall submit an itemized list of all items furnished describing each item and citing all appropriate specification sections and paragraphs. Each item shall be packed for long term storage and marked or tagged for easy identification.

1. Items shall be delivered to the project site to an area designated by the Owner.

2. The contractor shall provide an inventory of delivered items and obtain a receipt from the Owner after inspection. The inventory shall be delivered with an affidavit stating these are the specified spare parts or products delivered by the manufacturer or supplier of the installed equipment or material.

1.09 FINAL CLEANING.

A. Prior to final inspection, the contractor shall clean all interior and exterior surfaces exposed to view but shall avoid disturbing natural weathering of exterior surfaces.

1. Exterior Cleaning (During Construction)
   a. Construction debris shall be confined in strategically located container(s) covered to prevent blowing by wind. Debris shall be removed from the work area to container daily. Debris shall be hauled from the site once a week at a minimum.
   b. Protect existing trees before commencing work.
   c. Keep weeds and other vegetation trimmed to 3-inch max height.
   d. Remove soils, sand, and gravel deposited on paved areas and walks as required to prevent muddy or dusty conditions.
   e. Comply with stormwater general permit requirements and monitor and employ best management practices.
   f. Protect site furnishings from getting bumped or scratched during construction.

2. Exterior Cleaning (Final Cleaning)
   a. Remove trash and debris containers from the site. Reseed areas disturbed by location of debris containers.

b. Broom clean all paved surfaces.
c. Rake clean other surfaces of grounds.
d. Remove any dust or debris from site furnishings.

B. The contractor shall comply with all safety standards and shall not bury or burn waste on the site.

1.10 CERTIFICATE OF FINAL COMPLETION

A. The Owner/Project Manager will issue a Certificate of Final Completion in writing after successful plant startup with proper operation and control, correction of all punch list items, receipt and acceptance of the verification letter, and all items in Project Closeout section are completed.

END OF SECTION

SECTION 02255

DUST SUPPRESSION

PART 1 GENERAL

1.01 SUMMARY

A. Work under this Section shall include furnishing all materials, labor, equipment and miscellaneous items necessary to provide dust control over the entire project site.

1.02 SUBMITTALS

A. NA

PART 2 PRODUCTS

A. NA

PART 3 EXECUTION

3.01 DUST CONTROL

A. Dust control to be considered an integral part of the Work. Control shall be provided from the start of construction until the Work is complete. Fugitive dust as a result of construction shall be controlled at all times.

3.02 WATERING

A. For landscape installation and utility construction, dust control may be accomplished by water truck or spray system from an on-site water system if approved. Contractor shall be prepared to provide dust control until the final surface is completed.

B. The Contractor shall provide a water meter for metering any water taken from the municipal water system whether from fire hydrants or private taps. Watering shall be considered incidental to the related work and will not be paid for separately.

PART 4

END OF SECTION

SECTION 02700

FINISHED GRADING AND RESTORATION

PART 1 GENERAL

1.01 SUMMARY

A. This Work shall consist of finish grading, restoration of grounds and cleanup. This shall be a continuous process from project start-up to final acceptance of the Work by the Project Manager.

PART 2 PRODUCTS

2.01 GENERAL CLEANUP

A. Cleanup shall include the daily sweeping and washing of all hardscape surfaces where construction activities impacted the surfaces. If hardscape surfaces are damaged during construction, the contractor shall restore the surfaces to as good or better condition than that at the start of construction. The Project Manager shall be the sole judge as to whether streets, roads or property have been restored to a condition as good or better than at the start of construction.

B. The Contractor shall, at all times, keep property on which Work is in progress free from accumulation of waste material or rubbish caused by employees or caused by the Work, and he shall carry on a constant program to maintain Work area, structure sites, right-of-ways and the surface of streets and roads in a condition satisfactory to the appropriate authority, grantor of the right-of-way, and the Project Manager.

C. Preliminary cleanup shall commence as soon as the construction site is occupied by the Contractor (including his employees, supplies, materials or equipment) and shall be a continuous process, if necessary, in order that the site of the Work shall have an appearance and/or utility equal to or better than the start of the Work.

D. Upon completion of the Work, the Contractor shall remove all remaining rubbish, tools, equipment, scaffolds and surplus materials from the job and leave the Work area clean and free of debris.

PART 3 EXECUTION

3.01 GENERAL

A. All driveways, retaining walls, concrete flatwork, drainage ditches, trees, shrubs, and other miscellaneous items shall be returned to as good as or better than original conditions, if they are damaged by Work.

3.02 LANDSCAPING

A. See Section 02480 and 02821 for reseeding requirements.

PART 4

END OF SECTION

SECTION 02780

UNIT AND STONE PAVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stone Pavers

1.02 RELATED SECTIONS

A. Section 03300 – Cast in Place Concrete.

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. C140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
2. D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,000 ft-lbf/ft3 (600 kN-m/m3)).
3. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).

B. Interlocking Concrete Pavement Institute (ICPI):

1. ICPI Tech Spec Technical Bulletins

C. US Green Building Council (USGBC)

1. Leadership in Energy and Environmental Design (LEED), latest edition.

D. Americans with Disabilities Act (ADA) regulations, latest edition.

E. Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG), latest edition.

1.04 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Cleaning methods.

C. Verification Samples: For each product and finish specified, two full-size samples representing actual products, colors and textures.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten years of experience.

B. Installer Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five years demonstrated experience in installing products of the same type and scope as specified.

C. Mock-Up: Provide a completely assembled, typical wall areas installed with related accessories, in composite configurations designed to fulfill the performance criteria, and representative of the design as shown on the Drawings.

1. Install a 10 foot x 10 foot minimum mock-up in a location as directed by the Engineer or Architect.
2. Do not proceed with remaining work until workmanship is approved by the Engineer or Architect.
3. This area will be used as the standard by which the work will be judged.
4. Subject to acceptance by the Owner and Engineer or Architect, mock-up may be retained as part of the finished work.
5. If mock-up is not retained, remove and properly dispose of mock-up.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Do not install in rain or snow.

B. Do not install frozen bedding materials.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.

B. Store materials in manufacturer's original sealed, labeled packaging until ready for installation and in accordance with manufacturer's instructions. Protect from damage.

1.08 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not

install products under environmental conditions outside manufacturer's recommended limits.

1.09 WARRANTY

A. Manufacturer's Standard Material Warranty: At project closeout, provide to Owner or Owners Representative an executed copy of the manufacturer's standard limited warranty against manufacturing defect, outlining its terms, conditions, and exclusions from coverage.

PART 2 PRODUCTS

2.01 STONE UNIT PAVERS

A. Granite:Manufactured by Coldspring, 17482 Granite West Road, Cold Spring, MN 56320, (320) 685-4703.

1. Color:
   a. Carnelian: 8 inch x 24 inch x 3-1/4 inch, snapped edges, Diamond 10 finish top, sawn bottom, 2” joint with planting in between

2.02 BEDDING AND JOINT SAND

A. Bedding sand to be “Crusher Fines” from United Companies, County Road 143, Carbondale, Colorado

PART 3 EXECUTION

3.01 EXAMINATION

A. Prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions.

B. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

C. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

D. Inspect areas and conditions under which work is to be performed and notify the Architect in writing of conditions detrimental to the proper and timely completion of the work.

E. Verify that concrete base is sloped for drainage and is free of standing water, dust, oil, grease, paint, wax, curing compounds, primer, sealers, form release agents, or any deleterious substances and debris which may

prevent or reduce bonding. [Conduct moisture tests to verify that concrete surfaces are completely cured, free from hydrostatic pressure and having a moisture content of less than 5%.]

3.02 PREPARATION

A. Completely remove loose particles and debris from surface of concrete base. This may require mechanical grinding and scarifying of the surface.

B. Neutralize any trace of strong acid or alkali from the substrate prior to mortar application.

C. Surface to receive [slurry coat and] mortar shall have a tolerance of ±1/4 inch over 10 feet for normal mortar setting bed applications and ±1/8 inch over 10 feet for thin set mortar setting bed applications.

3.03 INSTALLATION

A. Install pavers using string line for precision.

B. Maintain 2 inch wide joints.

C. Joints shall be uniform and straight in all both directions

D. Lippage: maintain no greater than 1/16 inch height difference between adjacent pavers. Use level to confirm.

E. Edge of stone pavers to be secured with Pave Edge Pro Ridge. Follow manufacturer's instructions for installation. Follow Landscape drawing set L6.0 Detail 7 for instructions on where to install around granite pavers.

3.04 CLEANING AND SEALING

A. Clean and seal stone paver in accordance with the manufacturer's written recommendations.

3.05 FIELD QUALITY CONTROL

A. Surface tolerances on flat slopes should be measured with a rigid straightedge. Tolerances on complex contoured slopes should be measured with a flexible straightedge capable of conforming to the complex curves on the pavement surface.

B. The final surface tolerance from grade elevations shall not deviate more than ±1/4 inch under a 10 foot straightedge.

C. Check final surface elevations for conformance to drawings.

3.06 PROTECTION

A. Protect pavers from construction-related foot traffic for at least 24 hours after completion of the installation and general foot traffic for at least 72 hours after installatio.

B. Protect textured material during installation and afterwards. Cover and protect the textured surface from vehicular traffic during the construction period.

C. Protect installed products until completion of the project.

D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 02830

TREES, SHRUBS, PERENNIALS, WEED BARRIER AND MULCH

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

a. Landscape development work as shown on the drawings and in schedules.

B. Related Sections:

a. Irrigation System

1.02 SUBMITTALS:

A. Maintenance Instructions:

a. Submit 2 copies of typewritten instructions recommending procedures to be established by the Owner for the maintenance of landscape work for one full year. Submit prior to completion of planting for review by Landscape Architect.

1.03 QUALITY ASSURANCE:

A. Work of this Section shall be performed by a single firm specializing in landscape work having not less than 5 years successful experience in landscape projects of similar scope to this one.

B. Source Quality Control:

a. Ship landscape materials with certificates of inspection as required by governmental authorities. Comply with governing regulations applicable to landscape materials.

b. Trees, Shrubs, Grasses and Perennials: Provide trees, shrubs, grasses and perennials grown in a regional nursery in accordance with good horticultural practice. Provide healthy, vigorous stock grown under climatic conditions similar to conditions in the locality of the project and free of disease, insects, eggs, larvae, and defects such as knots, sun-scald, injuries, abrasions, or disfigurement.

C. Plant Material Inspection;

a. Landscape Architect and or Project Manager shall inspect plant materials when delivered to project site. Damaged, diseased or defective plant material will be rejected and shall be removed from project site. Rejected plant material will be replaced, at the expense of the Contractor, with healthy, vigorous stock.

1.04 PROJECT / SITE CONDITIONS:

A. Utilities: Prior to commencement of landscape work, Landscape Contractor shall contact affected utility companies and request on site flagging of utility locations. Project Record Documents shall be consulted to review designed locations of underground utilities. Contractor shall perform work in a manner which will avoid damage to utilities. Contractor shall be responsible to repair damage caused by construction.

B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstruction, notify Project Manager before planting.

C. Coordinate with landscape irrigation system work. Exercise special care to avoid damage to irrigation system.

D. Plant trees, shrubs, grasses and perennials during normal seasons for such work in location of project.

1.05 WARRANTY:

A. Warrant trees and shrubs for a period of one (1) year after date of acceptance, against defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond landscape installer's control. Replace at optimum planting time.

PART 2 - PRODUCTS

2.01 TOPSOIL:

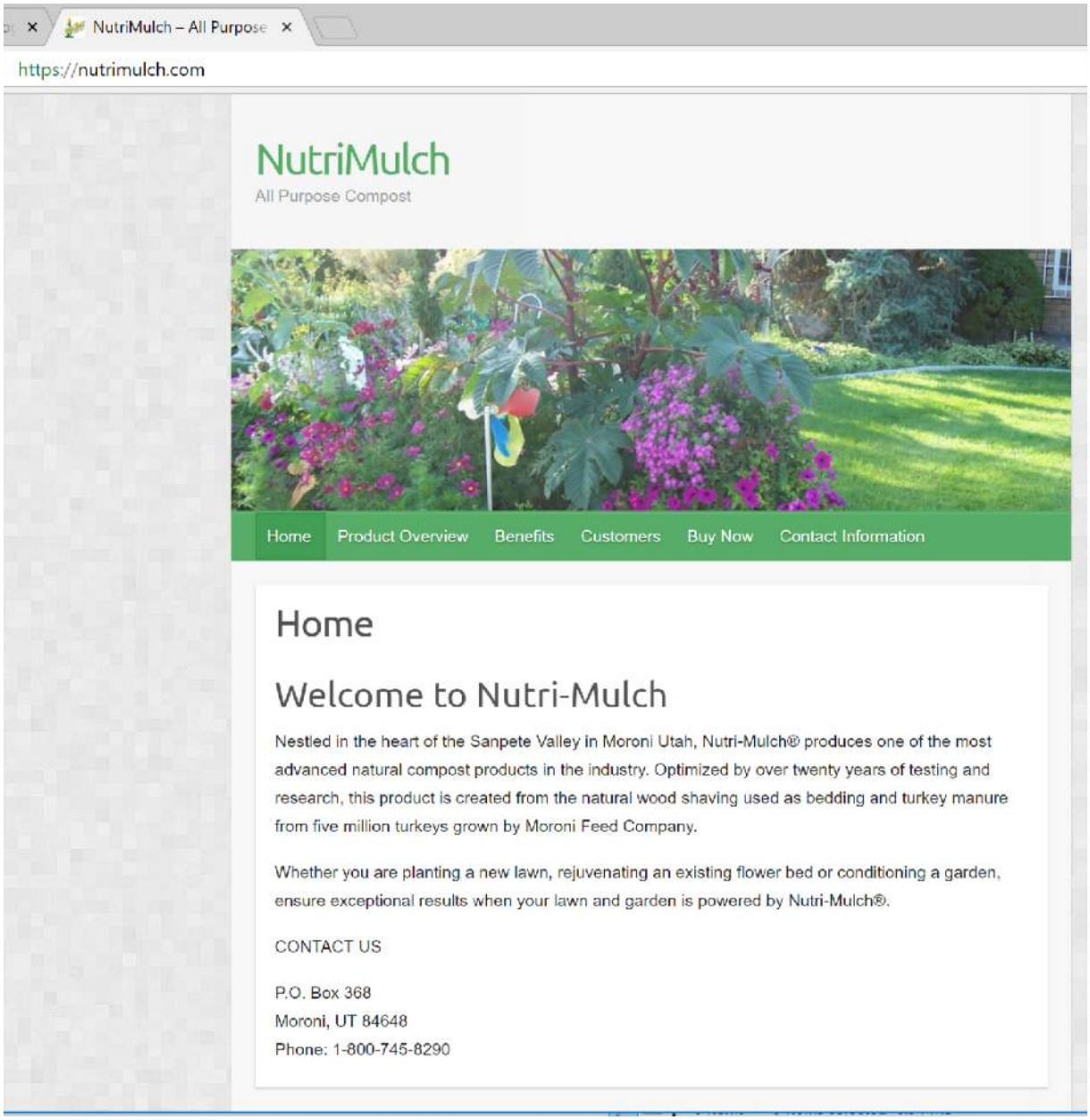
A. Provide Larson 60/40 new topsoil.

B. Plant Backfill:

a. For backfill at trees and shrubs, use a soil mixture containing one (1) part compost to four and one half (4.5) parts topsoil.

C. Soil Amendments:

a. Compost mulch: NutriMulch Brand.



2.02 PLANT MATERIALS:

A. Provide plant materials true to name and variety established by the American Joint Committee on Horticultural Nomenclature "Standardized Plant Names", Second Edition, 1942.

B. Quality: Provide trees, shrubs, and other plants complying with the recommendations and requirements of ANSI Z60.1 "Standard for Nursery Stock" and of not less than indicated sizes, balled and burlapped or container grown, unless otherwise indicated of specified.

C. Deciduous Shrubs: Provide shrubs of the height shown or listed and with not less than the minimum number of canes required by ANSI Z60.1 for the type and height of shrub required.

2.03 OTHER LANDSCAPE MATERIALS:

a. Mulch at base of trees/shrubs to be Yard Care “Mini Nuggets” bark mulch. Place in 2” deep layer.

b. Mulch to top-dress perennial planting areas to be Yard Care “Soil Pep” composted mulch. Place in 2” deep layer.

c. Root barrier to be Century Products CR-PE Multi-Purpose Root and Water Barrier Molded Rolls. 0.040 inch thickness. 12 inch height adjacent to pedestrian walkway. 24 inch height adjacent to concrete curb at road edge. See plan for locations. Install per manufacturers specifications.

Century Products
The Leader in Hardscape Protection

CR-PE Multi-Purpose Root & Water Barrier Molded rolls :

Manufactured from durable polyethylene material, the CR-PE Roll first features a natural water barrier with integrated 90° flared root deflecting ribs preventing costly damage to both hardscapes and pavements from root and/or water damage. Reduces construction cost on materials for projects up to 50% over standard root barrier panels with maximum protection.

Linear Application: For root pruning of existing trees or in planting situations where one or more trees are in close proximity to hardscapes.
-OR-
Tree Well Application: For new tree planting or when the hardscape encircles the planter

FEATURES:

- Most versatile & advanced root barrier on the market today.
- Reduces cost by combining two products into one effective Water and Root barrier
- Prevents water from seeping under pavements & roadways
- Integrated 90° Flared root deflecting ribs; self interlocking connection.
- Ease of installation: ribs provide stabilization during installation

MD = Machine Direction
TD = Transverse Direction

SPECIFICATIONS (Polyethylene)

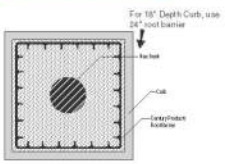
CR-PE Series: CR-PE12-20, CR-PE18-20, CR-PE24-20, CR-PE36-20.
Integrated 90° Flared root deflecting ribs with self interlocking connection.
Material: Polyethylene with ultraviolet inhibitors.
Thickness: 0.040" & 0.060"

MATERIAL	Polyethylene			
THICKNESS		0.040"		0.060"
PROPERTIES	ASTM TEST METHOD	V-ALUE POLYETHYLENE COPOLYMER (.040")	ASTM TEST METHOD	V-ALUE POLYETHYLENE COPOLYMER (.060")
MD Break Strength (psi)	D638	4236 psi	D638	2950 psi
TD Break Strength	D638	3278 psi	D638	3463 psi
MD Break Elongation	D638	725%	D638	603%
TD Break Elongation	D638	607%	D638	676%
Puncture Strength	D4833	111 lbs.	D4833	158 lbs.
MD Tear Strength	D1004	46 lbs.	D1004	64 lbs.
TD Tear Strength	D1004	42 lbs.	D1004	60 lbs.
Hydrostatic Resistance (psi)	D75, Procedure A	403 psi	D75, Procedure A	615 psi
MULTI-AXIAL TENSILE PROPERTIES	D75, Procedure A			
Maximum Stress (psi)		1954 psi	D5617 Procedure A Centerpoint Deflection Verses Pressure	1954 psi
% Elongation @ Rupture		31.1%	D5617 Procedure A Centerpoint Deflection Verses Pressure	31.1%

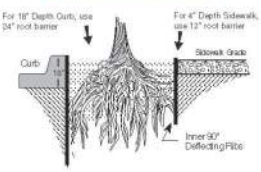
U.S. Standard
For Technical or Field Support, please call: (714) 632-7083

Tolerances may vary in order to maintain the integrity of post-consumer materials, and assure the material structure. We make no other warranties, express or implied, and specifically disclaim the warranty of merchantability or fitness for a particular purpose.

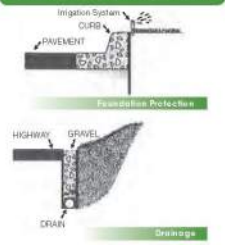
TREE WELL APPLICATION



LINEAR APPLICATION



DUAL PURPOSE WATER/BARRIER



* If planting adjacent curb, gutter & sidewalk, 24" material is recommended to contain roots.

CR-PE SERIES Dual Purpose Water/Root Barrier Molded Rolls

The **Century CR-PE Series Dual Purpose Water/Root Barrier Molded Rolls** are manufactured in 20' segments with integrated 90° flared root deflecting ribs; also available in custom lengths up to 100' with a flexible top safety edge for pedestrian safety. The barrier is cut to specified height (12" to 48") and installed in a linear application directly along the hardscape or cut to length as needed tree well applications. The ends are connected using the self-connecting molded rib. Use staples, friction fit, Century tape or equal, to secure connection.

I. SPECIFICATIONS

A. The Dual Purpose barrier shall be **CR-PE Series** manufactured by Century Products, 1144 N. Grove Street, Anaheim, CA 92806, (714) 632-7083 or approved equivalent.

B. The barriers are black molded root barrier rolls manufactured from recycled polyethylene plastic with ultraviolet inhibitors. Available in 0.040" (1.02 mm) & .0060" (1.52 mm) thickness.

C. Barriers available in standard 20' lengths and up to 100' various depths (12" to 48") as specified. Each roll shall have vertical integrated 90° flared root deflecting ribs protruding ½"-¾" from wall and placed 6-8" apart. A root impervious molded self-connecting end provides easy assembly using staples, friction fit, Century sealant tape, or equal.

II. INSTALLATION

A. Cut desired length of molded roll material and install directly alongside hardscapes for linear planting or install continuous piece contouring the tree well/planter.

B. Connecting: For use when utilizing as a **dual purpose water/root barrier** or tree well application. Connect the ends by overlapping two 6" (15 cm) sections with the leading rib cut directly down the middle and join with staples, friction fit, Century sealant tape or equal: See figure 2 & 3.

C. When necessary use an umbrella Cement nail to tack up barrier **** must be used above grade or water line.

D. Vertical integrated 90° flared root deflecting ribs are always facing the root ball.

E. Install the root barriers 1-2" above the grade to prevent root penetration above the barrier. (When adjacent to concrete, top of root barrier Must be at least 1/2" above Grade) Prepare your installation as shown in the illustrations. (Assemble barrier as shown in fig. 3)

F. Recommended for linear or tree well applications. Back fill with existing native soil. If necessary for drainage, use gravel or crushed rock. Avoid backfill less than 3/4" or greater than 1 1/2". Finish to grade. Do not distort barrier during installation.

G. Technical Questions? Contact Century Products at 714. 632.7083 for assistance.

Century Products
The Leader in Hardscape Protection

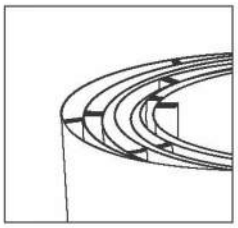


Fig. 2

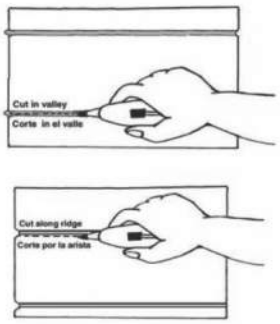
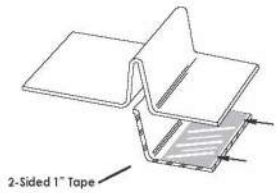
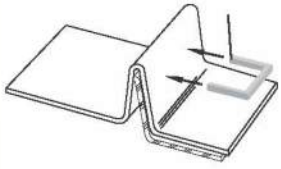


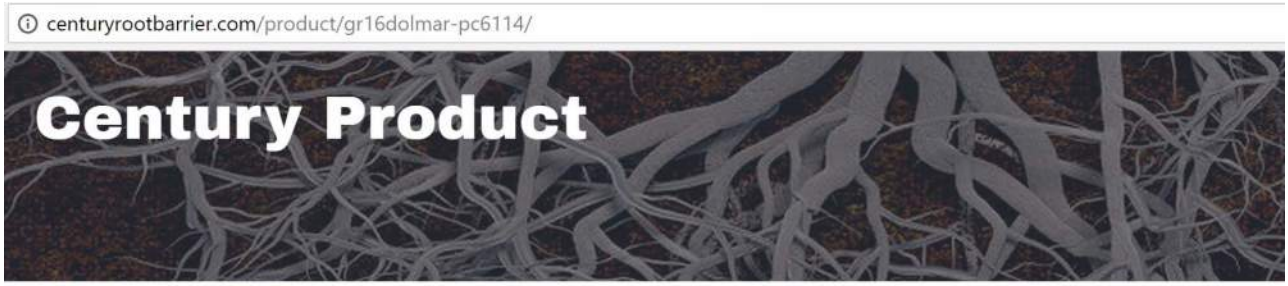
Fig. 3



Staple or Tape
STAPLES 2" APART



d. Root barrier installation option to utilize a “Geo Ripper”. Installation method shown in video at this link
https://youtu.be/K4wsni1RQsI



GR16/DOLMAR PC6114 2-STROKE
$2,519.37

GeoRipper GR16 includes a Dolmar® PC6114 or Makita EK6101 2-stroke engine (4.4HP), 16″ digging bar, two self-sharpening digging chains, 18mm combo wrench, spare nose bearing, spare drive belt and owners manual.

The GeoRipper GR16 is a commercial, portable handheld trencher used for trenching electrical, irrigation, fiber optic, landscape edging, dog fencing, root barriers, etc.

Quantity 1 ADD TO CART

PART 3 – EXECUTION

3.01 PREPARATION:

A. Layout individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure Landscape Architect's and City of Glenwood Springs acceptance before start of planting work. Make minor adjustments as may be requested.

B. Before mixing, clean topsoil of roots, plants, sod, stones, clay lumps and other extraneous materials harmful or toxic to plant growth.

C. Mix soil amendments at rates specified.

D. Mix soil amendments by suitable means to assure complete mixing and uniform texture using proportions for each use.

E. Soil preparation for flower, sod and seed zones. Spread Nutri-Mulch over area. Till into existing soil with motorized tiller. Till to 12” depth in flower beds, 6” depth in sod and seed areas.

F. For pit and trench type plant backfill, mix soil and soil amendments prior to backfilling, and stockpile at the site.

G. Excavation for Trees, Shrubs, Grasses and Perennials:

H. Excavate pits and trenches with vertical sides and with bottom of excavation slightly raised at center to provide property drainage. Loosen subsoil in bottom of excavation.

I. For balled and burlap or container grown stock, excavate as specified on the drawings.

J. Dispose of unacceptable subsoil removed from landscape excavations.

K. Where rubble fill is encountered, prepare planting pits properly be removal of rubble or other acceptable methods.

L. Use prepared plant backfill mix for setting and filling all plants. Allow a 3" settling layer of planting soil mixture.

3.02 PLANTING:

A. Planting Trees and Shrubs:

a. Set balled and burlap (B&B) stock on compacted soil, plumb and in center of pit or trench with top of ball flush with adjacent finish landscape grades and no deeper than it was in the nursery. When set, place additional backfill mixture and eliminate voids and air pockets. When excavation is 2.3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

b. Remove wire basket and burlap from sides of balls; retain on bottom.

c. Planting Container Grown Stock:

d. Set container grown stock as specified for balled and burlapped except remove from container. Do not damage root balls.

e. Dish top of backfill to allow for mulching.

f. Mulch pits, trenches and planted areas with specified mulch. Finish level with adjacent grades.

B. Pruning:

a. Remove dead wood and branches from trees and shrubs in accordance with standard horticultural practice.

3.03 OTHER LANDSCAPE MATERIAL:

A. Mulching:

3.04 MAINTENANCE:

A. Begin maintenance immediately after planting. Maintain trees, shrubs and other plants until final acceptance but in no case less than 30 days after substantial completion of planting. Restore planting saucers. Maintain moisture depth to ensure vigorous growth.

3.05 CLEANUP AND PROTECTION:

A. During landscape work, store materials and equipment where directed. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

3.06 INSPECTION AND ACCEPTANCE:

A. When landscape work is completed, including maintenance, the Project Manager will make inspect project to determine acceptability.

B. Where inspected landscape work does not comply with the requirements, replace rejected work and continue specified maintenance until re-inspected by the Project Manager and found to be acceptable. Remove rejected materials promptly from the project site.

C. Replace warranty items at one time and within 10 working days of notification.

END OF SECTION

SECTION 02920

TURF AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hydroseeding.
2. Sodding.

B. Related Requirements:
1. Section 02830" for trees, shrubs, ground covers, and other plants..
2.

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Project Manager to conduct pre-installation meeting if they desire.

1.5 SUBMITTALS

A. Qualification Data: For landscape Installer.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture, stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass sod. Include identification of source and name and telephone number of supplier.

C. Product Certificates: For fertilizers, from manufacturer.

D. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of turf and seeded areas during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf and grass seed establishment.
1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
2. Experience: five years' experience in turf and seeded grass installation.
3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.
4. Personnel Certifications: Installer's field supervisor shall have certification in one of the following categories from the Professional Landcare Network:
   a. Landscape Industry Certified Technician - Exterior.
   b. Landscape Industry Certified Lawncare Manager.
   c. Landscape Industry Certified Lawncare Technician.
5. Pesticide Applicator: State licensed, commercial.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

B. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

C. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

1.9 FIELD CONDITIONS

A. Planting Restrictions: Plant after irrigation system is operational.
1. Spring Planting: after ground has thawed.
2. Fall Planting: before ground is frozen.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 TURFGRASS SOD

A. Turfgrass Sod: Certified Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

B. Turfgrass Species: Sod of grass species as follows, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than .5 percent weed seed:
1. High altitude/drought tolerant bluegrass mix (Poa sp), a minimum of three cultivars.

2.2 FERTILIZERS

A. Commercial Fertilizer: Shall be approved by Project Manager prior to purchase or installation

B.
1. Composition: 1 lb/1000 of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

C. Slow-Release Fertilizer: Shall be applied at sod installation per manufacturer’s specifications. Granular or pelleted fertilizer shall be approved by Project Manager prior to purchase or application and shall consist of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.3 PESTICIDES SHALL NOT BE USED

2.4 EROSION-CONTROL MATERIALS- NA

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable, or which is dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Project Manager and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
   1. Protect adjacent and adjoining areas from hydroseeding and hydromulching overspray.
   2. Protect grade stakes set by others until directed to remove them.

3.3 SOIL PREPARATION

A. General: Prepare planting area for soil placement and mix planting soil according to soil preparation specifications in this document.

B. Placing Planting Soil: Place and mix planting soil in place over exposed subgrade.
   1. Reduce elevation of planting soil to allow for soil thickness of sod.

C. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

D. Before planting, obtain Project Manager's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

E. If hand broadcasted, rake seed lightly into top 1/8 inch (3 mm) of soil, roll lightly, and water with fine spray.

F. Protect seeded areas from hot, dry weather or drying winds by applying mulch within 24 hours after completing seeding operations. Soak areas, scatter mulch uniformly to a thickness of 1 inch and roll surface smooth.

3.4 HYDROMULCH OVER SEED

A. Hydromulching: Mix Project Manager approved fertilizer and fiber mulch (Conwed Fibers Enviromulch) in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
   1. Mix slurry with manufacturer recommended tackifier if needed.
   2. Spray-apply slurry uniformly to all seeded areas in a one-step process. Apply slurry at a rate so that mulch component is deposited at not less than1500 lb/acre dry weight and it forms a uniform blanket over seeded area.

3.5 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
   1. Lay sod across slopes exceeding 1:3.

C. Saturate sod with fine water spray within two hours of planting. During first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 2 inches below sod.

3.6 TURF MAINTENANCE

A. General: Maintain and establish turf by watering, fertilizing (if approved by Landscape Architect), weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
   1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
   2. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.

B. Watering: Install and maintain piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches (100 mm).
   1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.

C. Mow turf as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than one-third of grass height. Remove no more than one-third of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:
   1. Mow to a height of 2 inches.

3.7 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by Project Manager:
   1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m) and bare spots not exceeding 5 by 5 inches (125 by 125 mm).
   2. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of weeds, open joints, bare areas, and surface irregularities.

B. Use specified materials to reestablish turf that does not comply with requirements, and continue maintenance until turf is satisfactory.

3.8 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them off Owner's property.

C. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.

D. Remove nondegradable erosion-control measures after grass establishment period.

END OF SECTION

SECTION 323300

SITE FURNISHINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Seating and Tables.
2. Benches
3. Bicycle racks.
4. Trash receptacles.
5. Newspaper stand.

PART 2 - PRODUCTS

2.1 SEATING AND TABLES

A. Manufacturer: Landscape Forms

1. 4-Seat 35 Mingle

    a. Backed seats
    b. Table with umbrella hole
    c. Seat finish: Black powder coat, see mfr color sheet.
    d. Table Finish: Black powder coat, perforated top
    e. Surface mounted secured with Helical ground screw anchors. 1/2"x5" with 4" helix

2. 2-Seat 35 Mingle
    a. Backed seats
    b. Table with umbrella hole
    c. Seat finish: Black powder coat, see mfr color sheet.
    d. Table Finish: Black powder coat, perforated top
    e. Surface mounted secured with Helical ground screw anchors. 1/2"x5" with 4" helix.

B. Manufacturer: Sitescapes

1. Counter height Stadium bar seats

a. Backed seats
b. Seat finish: Black powder coat
c. Surface mounted

2. Counter height tables

a. Table finish: Silver powder coat
b. Surface mounted

2.2 BENCHES

A. Manufacturer: Streetlife

1. Heavy-heavy Benches, backless

a. Product number: H-L3-225
b. Manufacturer to apply sealant

2. Heavy-heavy Bench, backed

a. Product number: H-L3-2br-325
b. Manufacturer to apply sealant

2.3 OUTDOOR BICYCLE RACKS

A. Manufacturer: Bike Fixation (formerly Saris)

1. 2137 6 Bike Stadium Rack

a. Black Powdercoat
b. Free-standing

2.4 TRASH RECEPTACLES

A. Manufacturer: Pilot Rock

1. T&R Combo
a. Product number: BPRT2-72
b. Color: Black

2.5 NEWSPAPER STAND

A. Manufacturer: RFC Wire Forms

1. Outdoor Tabloid Rack

a. Product number: PRT-302-2D
b. Color: Black

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.

C. Install site furnishings level, plumb, true, and [**securely anchored**] [**positioned**] at locations indicated on Drawings.

D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.

E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch (19 mm) larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with [**nonshrink, nonmetallic grout**] [**or**] [**anchoring cement**], mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

F. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with [**nonshrink, nonmetallic grout**] [**or**] [**anchoring cement**], mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

END OF SECTION 323300

COLDSPRING™

SPLIT EDGE PAVERS
TECHNICAL DATA SHEET

1. PRODUCT NAME
Coldspring
Granite Split Edge Pavers

2. MANUFACTURER
Coldspring
17482 Granite West Road
Cold Spring, MN 56320-4578
Toll Free.....800-328-7038
Phone 320-685-3621
Fax.....320-685-8490

3. PRODUCT DESCRIPTION

Basic Use: Coldspring Split Edge Pavers are designed for use in exterior residential and interior/exterior commercial paving applications. Granite pavers are ideally suited for extreme conditions, as they resist wear, deterioration and weathering, while maintaining their natural beauty and finish indefinitely.

Composition & Materials: Split Edge Pavers are a natural granite stone product. Granite is an igneous rock, formed from liquid magma, cooled slowly to form a substance approaching the hardness and durability of diamonds. Granite's three essential minerals are feldspar, quartz, and mica. These minerals occur in different proportions, giving each granite its own color, texture and structural characteristics.

Standard Thickness: 1 ¼", 2", 3 1/8", 4 1/8"

Thickness Tolerance: ± 1/4".

Standard Sizes: 12" x 12", 8" x 4", 8" x 8", 4" x 4". Sizes may be actual or nominal, as specified by Purchaser.

Custom Sizes or Color: 3¼" x 3¼" to 24" x 24" custom pavers available with confirmation of size and color.

Top Face Dimension Tolerance: ± 1/4".

Weight: Granite weighs approximately 170 pounds per cubic foot. Per square foot, weight translates as:

1¼" Thickness = 18 LBS/FT²
2" Thickness = 30 LBS/FT²
3 1/8" Thickness = 45 LBS/FT²
4 1/8" Thickness = 60 LBS/FT²

Top Surface Finish: *Thermal/Flamed-Highly slip-resistant, rough-textured surface.

*If selected material is Mountain Green® or Mesabi Black®, the top surface finish will be Diamond 10 in lieu of Thermal.

Bottom Surface Finish: Surface may be sawn, thermal or partial polish. (No more than 50% polish left)

Edge Finish: Edges are split in a straight line with a hydraulic guillotine. The resulting edge is straight, but broken along the natural grain structure of the stone, resulting in concave and convex areas along the edge.

One or two edges of any individual split edge paver may have a sawn edge. If the stock used to cut a split edge paver has a straight edge, that edge is used as the pavers are cut, unless the purchaser specifies otherwise at the time of order. Once the pavers are installed, sawn edges are imperceptible.

Recommended Joint Width: 3/4". Split edge granite paving is sold by square foot of coverage based on the recommended standard joint width.

Color Ranges:
Black & Dark Gray
Dark & Red Brown
Red & Pink
Light Pink & Light Gray
Blue & Green

Availability of specific granite colors is subject to availability of post-production stock. Pavers are produced and sold as quarry run, meaning the

full color selection criteria for granite paving. Because pavers are a by-product of cut-to-size granite, larger orders require sufficient lead time. Please contact a Coldspring representative for details.

Technical Information: Standard specification selection criteria for granite paving.

ASTM C 97:	Density	165 LBS/FT^3 Min.
	Absorption	0.40 % Max.
ASTM C 170:	Compressive Strength	19,000 PSI Min.
ASTM C 99:	Modulus of Rupture	1,500 PSI Min.
ASTM C 241:	Abrasion Resistance	H_A25 Min.
ASTM C 880:	Flexural Strength	1,200 PSI Min.

File ASTM test results available.

4. INSTALLATION

Granite pavers are installed in a 1" to 2" wet mortar bed over a concrete slab or compacted fill base. The wet mortar bed is required to level the pavers (thickness tolerance ± 1/4").

5. AVAILABILITY AND COST

Contact Coldspring for inventory availability, cost and area dealer.

6. WARRANTY

Granite supplied by Coldspring is natural material, subject to variations in color, shade, markings, and texture. Samples provided may vary from material delivered.

All goods are carefully packed and inspected before delivery to the freight carrier. Material should be inspected by the buyer upon receipt. Coldspring will assist with any supporting paperwork for Buyer's claim.

Claims Procedure: Claims that may arise due to damage or loss in transit, must be made directly with the freight carrier within five (5) days after receipt of material. Coldspring's responsibility ceases upon delivery to the Carrier.

Exclusions: No claims will be allowed for any labor, nor does Coldspring accept any claims after the material is worked, cut and/or installed.

Coldspring shall not be responsible for damages, directly or indirectly, for the loss of any profits or other legal relief, due to delay in delivery, or failure to deliver goods, if said delay is caused by flood, natural disaster, fire explosion, acts of God, strike, embargo, shortage of field, transportation, war, national emergency or anything beyond Coldspring's control.

7. CANCELLATION

If the Buyer chooses to cancel or reduce an order, Coldspring may accept or reject any such requests. Material accepted for return requires authorization from Coldspring and is subject to a 25% restock charge. Only material packed in original crating will be accepted for return.

8. MAINTENANCE

Granite is easy to care for. Clean with mild soap and water. For stain prevention and removal, contact a stone care company. Information about such companies is available through Coldspring.

9. TECHNICAL SERVICES

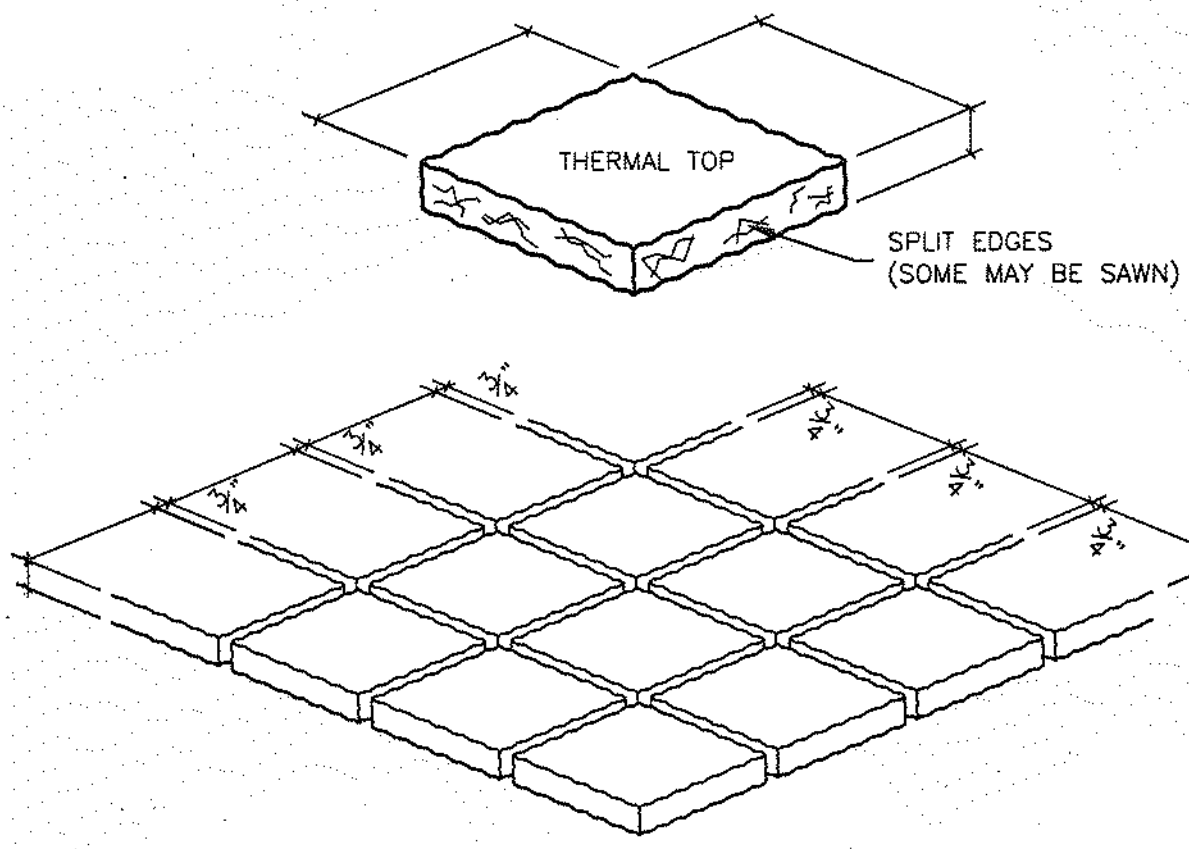
Local Coldspring dealers can address most specification, installation, and application questions. For further technical information, or the name of your area dealer, call Coldspring at 800-328-7038.

10. COLOR RANGE

Full quarry color range is provided without exception. They are produced as a standard stock item. Pavers will display broader range of color tone and natural quarry markings than custom cut work. The only criteria for rejection is the product quality, as relates to soundness.

Any range sample submitted for the custom fabricated portion of the project cannot be used as criteria for acceptance of the Split Edge paver portion of the project.

17482 Granite West Road, Cold Spring, MN 56320 T 800.328.5040 W www.coldspringusa.com



PLAN OF SPLIT EDGE PAVERS

_____ PIECES USING 3/4" JOINTS

TO COVER _____ SQUARE FEET

17482 Granite West Road, Cold Spring, MN 56320 T 800.328.5040 W www.coldspringusa.com

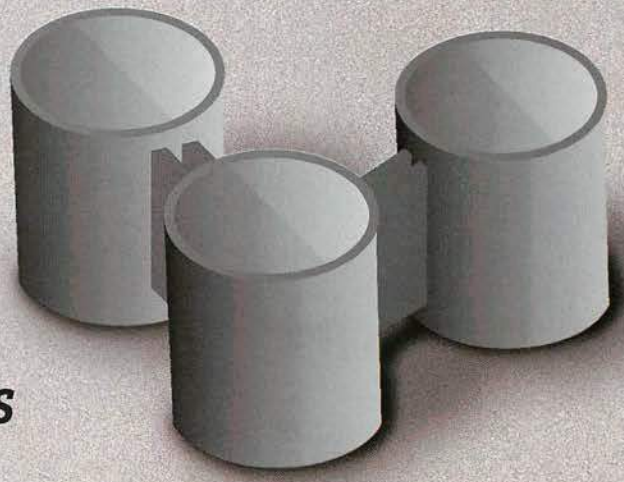
MURAROSY®

We add nature...

PAVE TECH's

ENVIROPAVE®

Structural Paver Spacers



...with environment-friendly paver spacers for grass joints

Müller & Co

NACHF. H. MÜLLER

Spezialartikel für die Bauwirtschaft

Phone +49 27 53 - 59 98 60 + 22 47
Fax +49 27 53 - 59 98 61 + 49 37

e-mail: mueller@muerarosy.de
http://www.muerarosy.de

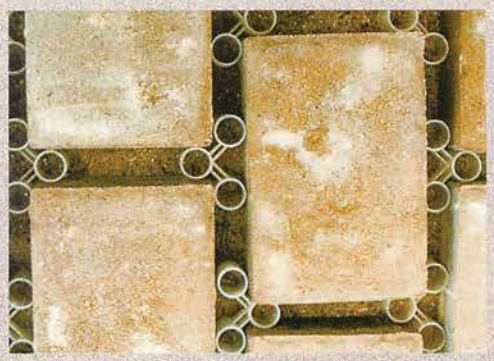
warehouse: Hauptmühle 9

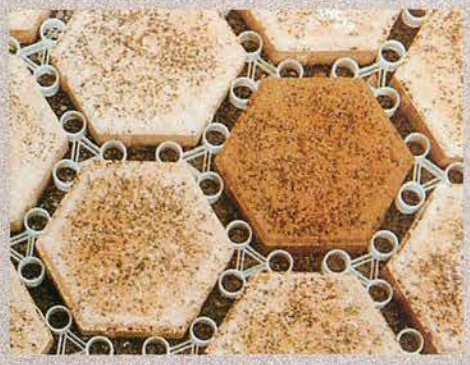
D-57339 Erndtebrück
Germany, Birkenweg 4

Quick and easy laying...

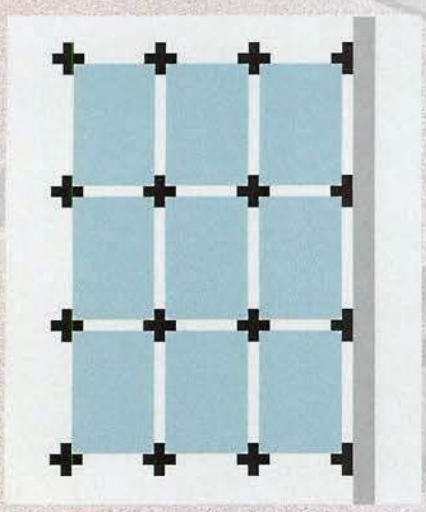
The environment-friendly paving spacer MÜRAROSY (DBGM) is intended to ensure absolutely even pre-determined spacing between the paving stones. This creates perfect overall spacing, guarantees good drainage and permits permanent horticulture.

The spacers are inserted perpendicular to the laying surface where the joints cross. One cylindrical element is laid between each pair of opposing paving stones, its diameter determining the space width. A spacer with four cylindrical elements can also be used where spaces cross.

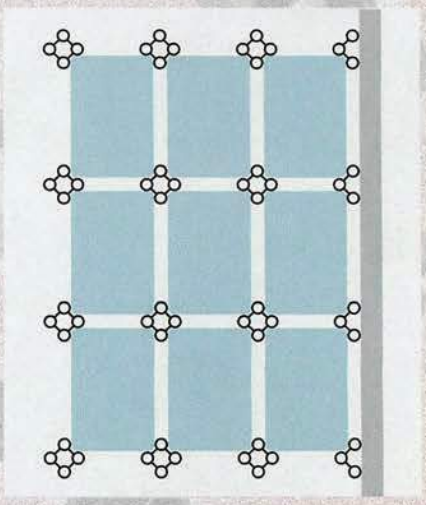




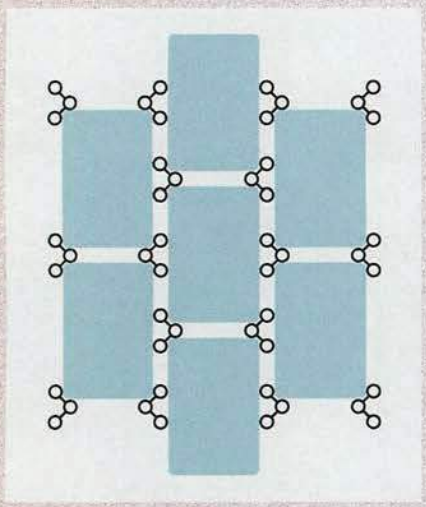
With MÜRAROSY you have free choice...



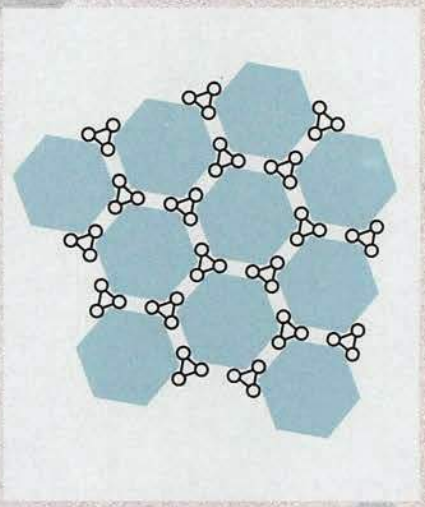
cross connection
edging with serial connection joint, width: 3, 5, 8, 10 mm



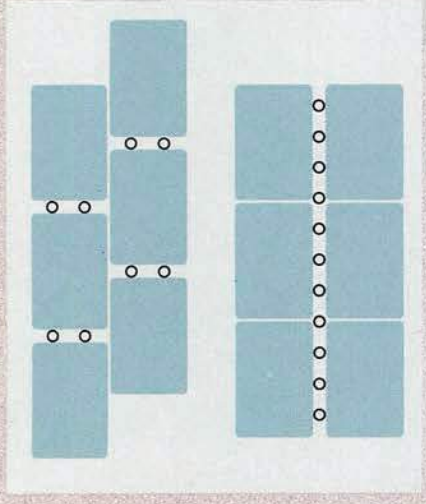
cross connection
edging with serial connection joint, width: 25, 28, 30, 40 mm



serial connection
joint, width: 17, 25, 28, 30, 33, 40 mm

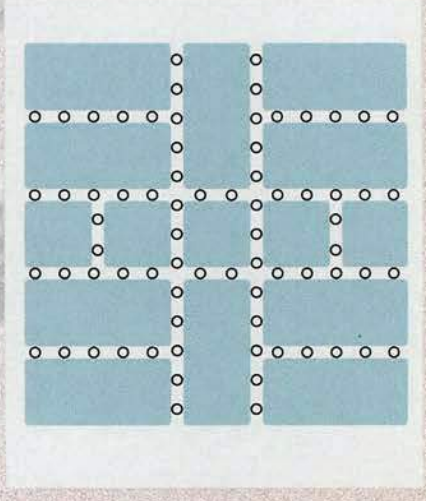


hexagonal paving
joint, width: 30 mm



NEW!

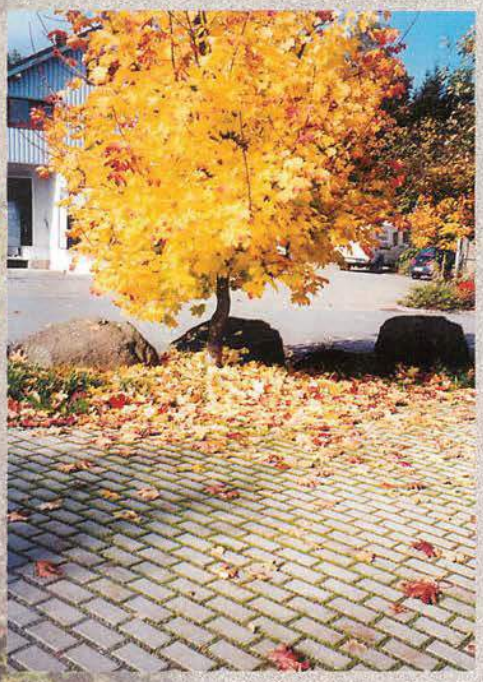
strip-system
joint, width: 20, 30, 36, 50 mm length: 40, 10 cm



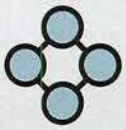
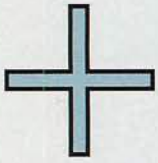
...formed in harmony with nature.

The MÜRAROSY paving stone spacer is made of environment-friendly weather-proof plastic (PE + PP) and permanently performs its function provided the pavement has the required resistance to normal traffic loads.

As the cylindrical elements are hollow, rainwater can drain off through them into the soil. The space within the tubular elements is filled with soil to permit planting of the spaces/joints.



Environment-friendly paving spacers

MÜRAROSY paver spacer	article-designation	piece per packing unit	piece per palett	height mm	joint, width mm
serial connection	17	1.000	26.000	38	17
	25	500	13.000	25	25
	28	400	10.400	45	28
	30	500	13.000	30	30
	33	250	6.500	45	33
	40	200	5.200	45	40
hexagonal paver	30-6	500	13.000	30	30
					
cross connection	25/4	400	10.400	25	25
	28/4	250	6.500	45	28
	30/4	300	7.800	30	30
	40/4	150	3.900	45	40
strip-system	40/20	300	6.000	45	20
	7/20	500	10.000	45	20
strip 40	40/30	200	3.000	45	30
	7/30	500	11.000	45	30
	40/36	160	3.200	45	36
strip 7	7/36	300	7.800	45	36
	40/50	120	2.400	45	50
	7/50	200	5.200	45	50
serial connection	T 3/30	1.000	26.000	30	3
	T 5/30	1.000	26.000	30	5
	T 5/50	500	13.000	50	5
	T 8/30	500	13.000	30	8
	T 10/30	500	13.000	30	10
cross connection	cross 3/30	1.000	26.000	30	3
	cross 5/30	500	26.000	30	5
	cross 5/50	500	13.000	50	5
	cross 8/30	250	6.500	30	8
	cross 10/30	500	13.000	30	10
turf-edging-element	grass art	300	7.800	45	30
					

Consumption of paving spacers = piece/square meter (= 10.764 sq. ft.)

paver	serial connection and cross connection (/4)										strip		strip		strip		strip		T	cross	T	cross	T	cross
dimension	17	25	25/4	28	28/4	30	30/4	33	40	40/4	7/20	40/20	7/30	40/30	7/36	40/36	7/50	40/50	10/30	10/30	8/30	8/30	T 5	5
10 x 10	146	128	64	-	61	-	59	-	-	51	69	20,9	59	19,2	54	18,4	-	-	165	83	171	86	181	90
9 x 12	136	120	60	-	57	-	55	-	-	48	-	-	-	-	-	-	-	-	154	77	159	80	168	84
8 x 16	116	103	52	98	50	96	48	-	-	42	-	-	-	-	-	-	-	-	131	67	135	68	143	71
12 x 12	106	97	48	-	46	-	44	-	-	39	51	17,9	45	16,7	41	16,0	35	14,7	118	59	122	61	128	64
12 x 16	82	75	37	72	36	70	35	-	-	31	40	17,9	35	16,7	33	16,0	28	14,7	90	45	93	47	97	49
14 x 14	81	74	37	-	36	-	35	-	-	31	39	15,6	35	14,7	32	14,2	28	13,2	89	45	91	48	95	48
10 x 20	79	71	36	68	34	67	33	64	60	30	38	20,9	34	19,2	31	18,4	-	-	87	44	89	45	93	46
12 x 18	74	67	34	65	33	63	31	-	-	28	36	17,9	32	16,7	30	16,0	26	14,7	81	41	83	42	86	43
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14 x 21	56	52	26	50	25	49	25	47	44	22	27	15,6	25	14,7	23	14,2	20	13,2	61	31	62	31	64	32
16 x 24	44	41	20	40	20	39	20	38	36	18	21	13,9	20	13,2	18	12,8	16	12	47	24	48	24	50	25
20 x 20	42	40	20	38	19	38	19	37	34	17	21	11,4	19	10,8	18	10,6	16	10	45	23	46	23	48	24
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15 x 30	38	35	18	34	17	34	17	33	30	15	18	14,7	17	13,9	16	13,4	14	12,5	40	20	41	21	42	21
24 x 32	23	22	11	21	11	21	11	21	20	10	11	9,6	11	9,3	10	9,1	10	8,7	24	12	25	12	25	13
30 x 30	20	19	10	18	10	18	9	18	18	9	10	7,8	9	7,8	9	7,4	9	7,1	21	11	21	11	22	11

PAVE TECH
ADVANCED PAVING TECHNOLOGY

PAVE TECH
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PO Box 576
Prior Lake, MN 55372 US
Ph. 952-226-6400
Fax 952-226-6406
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TOLL FREE 800-728-3832

Laying tips:

When laying the MÜRAROSY spacers make sure the paving stones are completely enclosed by the spacing elements and securely seated. Laying in connected cross-shaped series requires the use of straight series spacers at the edges as otherwise the paving stability is unreliable. The MÜRAROSY strip 40 is laid lengthways along the paving stones to be laid. Strip 7 is laid crosswise between the stones. The enclosed railing part should be laid on the soil or under-surface.

After a paving surface with stones and spacers has been finished, it must be hand tamped. The turf edging can then be filled in.

Warning:
Filling it in before tamping causes the spacers to be pushed upward and made visible.

Distributed by:

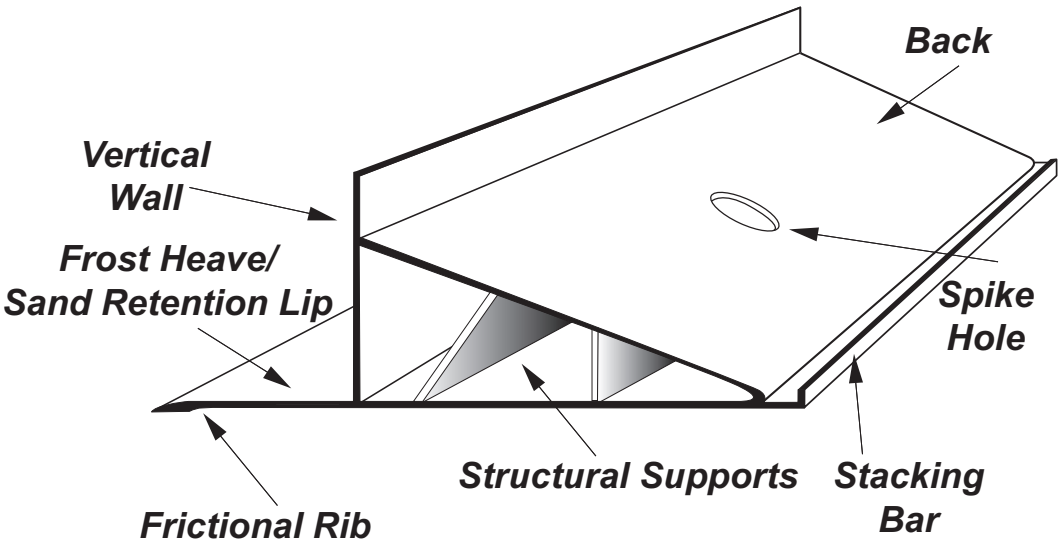
Can your Edge Restraint hold up to this?

PAVE TECH's

PAVE EDGE®

ORIGINAL Paver Edge Restraint

MATERIALS & DESIGN



Polyvinyl Chloride (PVC)

- 100% premium grade PVC
- Superior strength
- Has "memory", as it moves under load it returns to its original shape

Triangular, Reinforced, Hollow Core Design

- Engineered to ensure vertical wall stays perpendicular to the pavement
- Provides the best structural support
- Ties into the pavement system
- Allows for truly straight edges and smooth curves

Frost Heave / Sand Retention Lip

- Utilizes the downward pressure of load and the weight of the pavers to tie the edging to the pavement
- Guarantees edging will move as part of the pavement system under normal conditions and also during frost heave cycles
- Bedding sand will not migrate from under the edging

Frictional Rib

- Provides lateral load resistance by 'biting' into the aggregate base

Stacking Bar

*(Available on **PAVE EDGE Standard**)*

- Makes ***PAVE EDGE*** easier to stack and store

Pre-Drilled Spike Holes

- Accommodates 3/8" diameter steel landscape spikes
- Spaced evenly every 12" on ***RIGID***, if further strength is needed, spikes can be driven through the PVC anywhere
- ***FLEXIBLE*** has one hole per back support to provide the most efficient support

Connector

- Connector tubes are inserted into the ends of ***PAVE EDGE*** for seamless connections
- This type of connection provides unrivaled strength
- Without manufactured connection points, ***PAVE EDGE RIGID*** & ***FLEXIBLE*** connect together at any point and in any length

***PAVE EDGE** should be stored flat and out of direct sunlight. Cartons should be covered against rain.*

PRO vs STANDARD

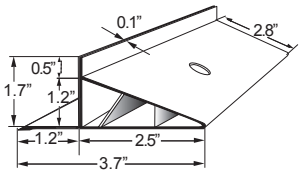
Just like our industry, which continues to evolve, ***PAVE EDGE*** now offers two versions of what has become the hardscape industries leading paver edge restraint. With two versions of this great patented design, the choice is yours...

PAVE EDGE Pro

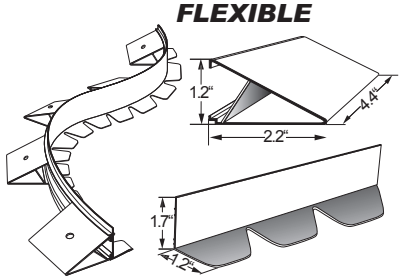
- Original Design
- Contains up to 60% more material by weight than other paver edge restraints
- Produced with up to 35% recycled PVC material
- Engineering tests prove ***PAVE EDGE Pro*** outperforms all other leading paver edge restraints
- Made in the USA

This classic design is the same great product that contractor professionals have been using for over 20 years.

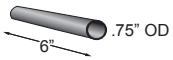
RIGID



FLEXIBLE



CONNECTOR

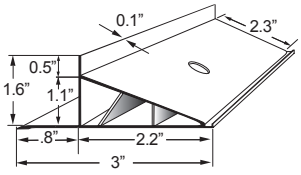


PAVE EDGE Standard

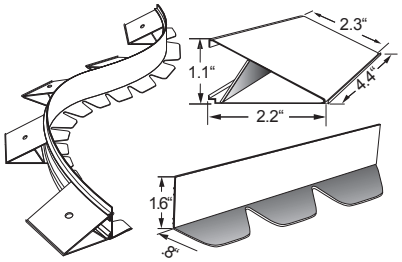
- Modified ***PAVE EDGE*** to allow for better pricing
- Stacking bar for easier stacking, storage and distribution

PAVE EDGE STANDARD offers features that are increasingly more important in today's market. Taking the original patented design and modifying certain features allows for better pricing without compromise. Although the dimensional profile has been reduced slightly for cost effectiveness, a stacking bar was integrated into the new design for easier distribution.

RIGID



FLEXIBLE



CONNECTOR

PAVE EDGE PROFILES

Multiple profiles provide best performance for varying application needs

Because no one product can meet the needs of all pavement applications, ***PAVE EDGE*** is available in three profiles: ***RIGID***, ***FLEXIBLE*** and ***INDUSTRIAL***.

RIGID

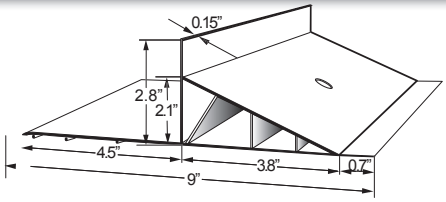
- Straight one piece sections
- Designed for straight runs & gradual curves
- Engineered to withstand vehicular traffic
- Requires fewer spikes
- No restrictions on spike placement; can be driven through the back at any location
- Can be made flexible by cutting v-shape notches in the back
- Use with pavers 6-8 cm thick

FLEXIBLE

- Pre-assembled two piece flexible sections
- Utilizes same engineered profile as **RIGID**
- Flexible enough to create a radius as small as 24 inches
- Use with pavers 6-8 cm thick

INDUSTRIAL

- Straight one piece sections
- Developed to meet the demanding needs of commercial and industrial applications
- Larger profile with thicker walls and extended lip with additional frictional ribs
- Most economical and best alternative to concrete and granite curbing
- Use with pavers 8 cm or thicker
- Great for permeable paver applications



COMPONENTS

Currently there are no industry specifications for an important component of a flexible paver system... the edge restraint.

The edge restraint's responsibility is to ensure the pavement stays as tight, strong and good looking as the day it was created by withstanding loads created by pavement energy. Pavement energy is the constant pressure of pavers against each other. Traffic loads are the momentary dynamic forces imparted by traffic.

Components of a Segmental Pavement System

- Sub-base
- Base
- Bedding & Joint Sand
- Pavers
- Bond Pattern
- Edge Restraints

Common Reasons Flexible Paver Systems Fail

- Base not thick enough for type of traffic load
- Poor base compaction
- Insufficient base extension
- Bedding sand layer too thick or uneven
- Improper paver aspect ratio for the type of traffic load
- Edge restraint failure

Edge Restraint Failure

- Horizontal shifting occurs
- There is permanent deformation of the edge restraint under load
- Effects interlock, which is critical to life performance
- It is during initial compaction when most residential and pedestrian pavements receive their greatest load

COMPARISONS

Engineered pavement systems have been perfected over many decades. Manufactured plastic edge restraints are a recent evolution to an already proven system. Unfortunately, many edge restraints do a poor job of creating pavement energy and maintaining system interlock.

How much does it cost to go back and repair a job that is already completed? Besides the loss of revenue from not working on a paying job, valuable man hours are wasted, along with excessive wear and tear on trucks and equipment. Not only is customers confidence lost, but damage is done to your company's reputation.

PAVE EDGE Features

- Least amount of deformation after compaction
- It is the only patented paver edge restraint system in the world designed by a contractor for exclusive use with pavers
- Designed for pedestrian, vehicular and commercial applications
- Contains up to 60% more material by weight than other paver edgings
- Environmentally Safe; Non-reactive to all plantings and grass
- Allows at least 2" of top soil or sod from ***PAVE EDGE*** to top of paver. Industry experts recommend a minimum 1" of top soil for healthy grass growth
- Hollow core design does not act as a heat sink in summer and will not dry out the soil and plantings above
- Only edging with patented frost heave sand retention lip
- **PAVE TECH** offers the strongest technical support in the industry including installation brochures and DVDs, marketing materials, training products, and a trained and knowledgeable staff

Alternative Edge Restraints

- **"L" Shaped Plastic edge restraints** – are made of lower quality plastic, "L" shape doesn't tie pavement together, strength is compromised without the back support, requires greater spiking frequency, connections are often inflexible and makes flat spots in curves
- **Steel & Aluminum** – bends easily, once bent it cannot be used, naturally corrosive in nature which shortens life expectancy, and the same problems experienced with plastic "L" shaped edging occur with steel and aluminum. Average height inadequate for retaining sand and pavers
- **Concrete Toe** – much higher overall per foot cost to install, inconsistent quality doesn't tie the pavement together and has a much shorter life expectancy. Creates a non-flexible edging around a flexible pavement.

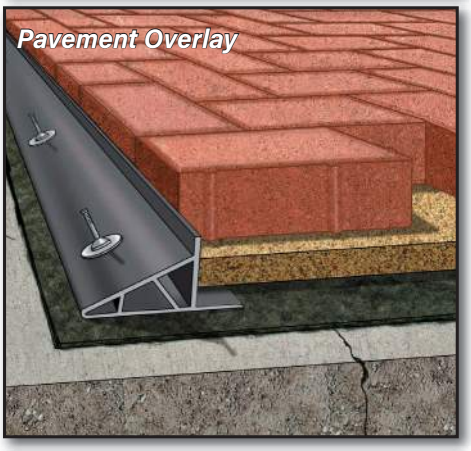
When the pavement shifts outwards, the joints open and interlock along the perimeter deteriorates. As the edge continues to shift out, this deterioration will continue to work into the pavement at an accelerating rate.

SPECIALIZED APPLICATIONS

Visit paveedge.com for complete installation instructions for all Specialty Applications.

Retaining Walls

- Cost Savings – does not require a full layer of buried wall block
- Time Savings – labor efficient, does not require working in a ditch
- Visual Footprint, allows changes to be made to the design before laying a single wall block
- Recommended for residential walls that do not require engineering



Pavement Overlays

- Segmental pavement installation over concrete or asphalt surface
- Overlays rehabilitate old pavements
- Pavement area can remain the same size or can be enlarged

Natural Stone

- Pathways and patios made with natural stone, such as flagstone, marble, and granite have become popular
- Installation is similar to segmental pavements

Permeable Pavements

Specially designed concrete pavers are installed in a way that allows rain and other water to percolate into the ground rather than dispersing water away from the pavement. This reduces or eliminates the need for retention ponds.

- **Berm Method** – Utilizes a berm of dense graded aggregate base compacted around the outside of the permeable pavement. The berm allows spikes to be used to anchor the edge restraint.

SPECIFICATIONS

for SEGMENTAL PAVER EDGE RESTRAINTS

This architectural specification for edge restraints is based on proven performance of properly constructed segmental pavements using current industry installation standards.

Part 1 – GENERAL

1.1 Scope of Work

A. Installation of plastic paver edge restraints on dense graded aggregate base.

Note: Separate plastic paver edge restraint installation specifications are available for specialty applications

1. Geo/Bedding Wrap Method for open-graded base (permeable)
2. Geo/Bedding Wrap Method for other flexible base

1.2 System Description

A. Segmental paver systems installed over compacted dense-graded aggregate base material with a nominal 1" (25 mm) layer of bedding sand using a plastic edge restraint.

1.3 Submittals

A. 3' (90 cm) samples of edgings to be used, properly marked and identified by manufacturer and distributor with accompanying manufacturer MSDS.

B. Products submitted should incorporate the following features and components identified in a drawing with submittal. (See Section 2.1)

1.4 Tests

A. Submit a STORK METHOD engineering test report showing Deformation and Load performance data meeting minimum requirements, as defined in Section 2.2

1.5 Storage Conditions

A. Always store edgings flat and out of direct sunlight. Leave boxed or bundled until used.

Part 2 – PRODUCT

2.1 Edging Properties

A. PROFILE – Should incorporate the following components

1. Edge restraint footprint surface must be solid and uniform containing voids no larger than 50%.
2. Frost heave/sand retention lip, extending a minimum ½" (13 mm) under the bedding layer with a minimum of 75% coverage along the length of the edging.
3. Frictional resistance rib(s) having a minimum of one rib under the lip.

B. COMPOSITION – Polyvinyl Chloride (PVC)

C. MATERIALS

1. Rigid style edging for straight runs and gradual curves.
2. Flexible style edging for sweeping and tight radius curves with the flexibility to create a radius as small as 24" (600 mm).
3. Height minimum of 1⅝" (41.3 mm)
4. Connection piece shall provide complete end to end contact on all pavement facing edges without piece to piece lippage. Connection device shall extend beyond splice at least 2" (51 mm) in each direction from splice.
5. Anchoring to be completed with 10" (25 cm) long x ⅜" (1 cm) diameter steel landscape spikes
   - Maximum spike spacing for rigid style edging = 24" (600 mm)
   - Maximum spike spacing for flexible style edging = 12" (300 mm)

2.2 Edging Performance

A. Edging performance must meet minimum requirements based on the STORK METHOD (see Appendix A for STORK METHOD definition).

B. SPECIFICATIONS

1. **Deformation**
   Rigid style:
   Maximum Deformation = 0.0044" (0.112 mm)
   Flexible style:
   Maximum Deformation = 0.0154" (0.4 mm)
2. **Load**
   Rigid style: Minimum Load = 252 lbf* (1.1214 kN)
   Flexible style: Minimum Load = 230 lbf* (1.0235 kN)
   *lbf = pounds force, kN = kilonewton

Part 3 – EXECUTION

3.1 Base Preparation

A. Follow project engineer's specifications for dense-graded base and base extension. Refer to ICPI and BIA base guidelines in absence of sufficient project specifications regarding base and base extension preparation.

3.2 Edging Installation

A. Installing edging BEFORE bedding sand and pavers

1. Per industry recommendations, place edging on compacted base. Never allow edging to be installed on top of the bedding layer.
2. Spike rigid style edging using pre drilled holes, with a maximum spacing of 24" (600 mm) between spikes. If holes do not meet spike placement requirements drive spike through the back at required location. When installing flexible style edging with a maximum spacing between spikes of 12" (300 mm).
3. Connect additional sections of edging as needed (See Section 2.1, C-4 for connection)

B. Installing edging AFTER sand & pavers

1. Using a trowel or flat head shovel, cut down along the back of the paver, pulling away the excess bedding sand without disturbing the base material.
2. Connect sections together (See Section 2.1, C-4 for connection).
3. Place edging directly on the base material. Slide the retention lip **under** the bedding layer. Never allow edging to be installed on top of the bedding layer.
4. Spike into place following the same spike placement specifications as in section 3.2, A-2. When installing after bedding layer and pavers, nail the spike at an angle with the point driven inward toward the pavement (toe-nailing). This is a preferred practice to keep edging tight to the pavement.

3.3 Installation of sand and pavers

A. Install bedding sand and pavers following project specifications.

3.4 Landscaping

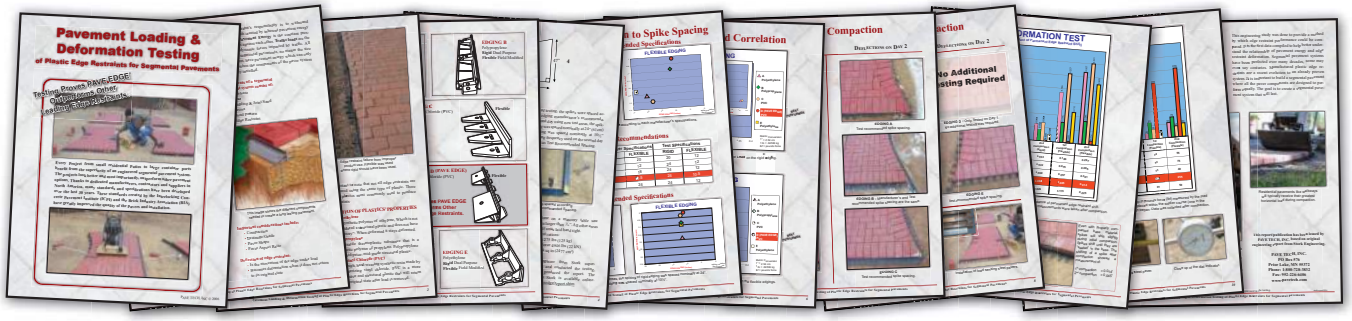
A. Soil backfill and remedial landscaping to be completed per contract by others.

ENGINEERING TESTS

Independent Engineering Tests Prove PAVE EDGE Outperforms Other Leading Edge Restraints.

THIS REPORT SHOWS:

- ✓ Which Edging Designs were Tested
- ✓ What are the Properties of Plastics
- ✓ When Edge Restraints Fail
- ✓ Why Flexible Pavement Systems Fail
- ✓ How Test Areas were Prepared to ICPI / BIA Installation Specifications
- ✓ Why this Testing is Important to the Paver Industry
- ✓ Photos and Graphs to Support Findings



Excerpts from the 'Pavement Loading & Deformation Testing' Report

Segmental pavement system interlock is critical to the performance and life of the pavement. Edge restraint failure affects interlock. **PAVE TECH, INC.** engaged Stork Twin City Testing Corporation (Stork), an engineering and testing company located in St. Paul, Minnesota, to design a test that could measure comparable performance of the most common manufactured plastic paver edge restraints on the market.

TO RECEIVE YOUR COPY OF THIS REPORT

Call: 952-226-6400 Email: info@paveedge.com

Online: pavetech.com/stork-report/

PAVE EDGE INDUSTRIAL was installed by **PAVE TECH** in 1989 at an aggregate pit in Minnesota. The estimated weight of the loaded trucks going out since installed is in excess of 10,000,000 tons! The original outward shift of the spikes was 3/8" in the first month after installation and has never shifted again.

HONEY LOCUST

Gleditisia triacanthose L.

Plant Symbol = GLTR

Contributed By: USDA NRCS National Plant Data Center & the Biota of North America Program

R. Mohlenbrock
USDA, NRCS, Wetland Science Institute
@ PLANTS

Alternate common names
Common honey-locust, honey-shucks locust . honeylocust, honey locust

Uses
Honey-locust is widely planted as a hardy and fast-growing ornamental. It is often used in extreme urban stress areas such as parking lot islands and sidewalk tree squares and has been planted for erosion control, for windbreaks and shelterbelts, and as a vegetation pioneer for rehabilitation of strip-mine spoil banks. Because of the small leaflets and open crown, the trees cast a light shade that permits shade-tolerant turfgrass and partial-shade perennials to grow underneath. Cultivars have been selected for crown shape and branch angles and leaf color, and most are both thornless and fruitless. Over-use of honey-locust in cities has led to recommendations that its use be discouraged until adequate biodiversity is restored.

Honey-locust wood is dense, hard, coarse-grained, strong, stiff, shock-resistant, takes a high polish, and is durable in contact with soil. It has been used locally for pallets, crates, general construction, furniture, interior finish, turnery, firewood, railroad ties, and posts (fence posts may sprout to form living fences), but it is too scarce to be of economic importance. The wood also was formerly valued for bows.

The geographic range of honey-locust probably was extended by Indians who dried the legumes, ground the dried pulp, and used it as a sweetener and thickener, although the pulp also is reported to be irritating to the throat and somewhat toxic. Fermenting the pulp can make a potable or energy alcohol. Native Americans sometimes ate cooked seeds, they have also been roasted and used as a coffee substitute.

Honey-locust pods are eaten by cattle, goats, deer, opossum, squirrel, rabbits, quail, crows, and starling. White-tailed deer and rabbits eat the soft bark of young trees in winter, and livestock and deer eat young vegetative growth. Honey-locust is planted around wildlife plots and into pastures and hayfields to provide high-protein mast. Cattle do not digest the seeds, but sheep do.

Status
Please consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status and wetland indicator values.

Description
General: Pea Family (Fabaceae). Native trees growing to 20 meters tall, with an open crown, armed with thick-branched thorns to 20 cm long on the main trunk and lower branches. Bark blackish to grayish-brown, with smooth, elongate, plate-like patches separated by furrows. Leaves are deciduous, alternate, pinnately or bipinnately compound, 10-20 cm long, often with 3-6 pairs of side branches; leaflets paired, oblong, 1-3 cm long, shiny and dark

green above, turning a showy yellow in the fall, typically dropping early. Flowers are greenish-yellow, fragrant, small and numerous in hanging clusters 5-13 cm long, mostly either staminate (male) or pistillate (female), these usually borne on separate trees, but some perfect flowers (male plus female) on each tree (the species polygamo-dioecious). Fruits are flattened and strap-like pods 15-40 cm long and 2.5-3.5 cm wide, dark brown at maturity, pendulous and usually twisted or spiraled, with a sticky, sweet, and flavorful pulp separating the seeds; seeds beanlike, about 1 cm long. The common name "honey" is in reference to the sweet pulp of the fruits.

Variation within the species: *Gleditsia triacanthos* var. *inermis* (L.) Schneid. ("inermis" means unarmed) is occasionally found wild, apparently more as a populational variant than what is generally given formal taxonomic status as a variety. Such trees have provided stock for selection of some the thornless horticultural forms, but most of the latter are actually derived from buds or stem cuttings taken from the upper, thornless portions of physiologically mature trees thorny in the lower portions. Scions taken from this area generally remain thornless. Breeders also can control the sex of scions by selecting unisexual budwood for cuttings. Certain branches bear only one type of flower, and trees from cuttings of those branches will bear only that type.

Southern races of the species produce fruit more nutritious for stock feeding than northern races.

Natural hybridization between honey-locust and water-locust (*Gleditsia aquatica*) produces *Gleditsia* X *texana* Sarg., the Texas honey-locust.

Distribution

Honey-locust is essentially Midwestern in distribution, from the west slope of Appalachians to the eastern edge of Great Plains -- scattered in the east-central US from central Pennsylvania westward to southeastern South Dakota, south to central and southeastern Texas, east to southern Alabama, then northeasterly through Alabama to western Maryland. Outlying populations occur in northwestern Florida, west Texas, and west central Oklahoma. It is naturalized east to the Appalachians from South Carolina north to Pennsylvania, New York, and New England and Nova Scotia; sometimes a weed tree in India, New Zealand, and South Africa. For current distribution, please consult the Plant Profile page for this species on the PLANTS Web site.

Establishment

Adaptation: Honey-locust occurs on well-drained sites, upland woodlands and borders, rocky hillsides, old fields, fence rows, river floodplains, hammocks, and rich, moist bottomlands. It is most commonly found on moist, fertile soils near streams and lakes. It is tolerant of flooding and also is drought-resistant and somewhat tolerant of salinity. On bottomlands, it is a pioneer tree. On limestone uplands, it is an invader of rocky glades and abandoned farm fields and pastures. It is generally found below 760 meters, but up to 1500 meters in a few places. Flowering: May-June; fruiting: September-October, sometimes remaining on the tree through February.

General: Seed production begins on honey-locust trees at about 10 years and continues until about age 100, with optimum production at about 25-75 years of age. Some seed usually is produced every year but large crops usually occur every other year. The seeds are viable for long periods because of a thick, impermeable seed coat. Under natural conditions, individual seeds become permeable at different periods following maturation so that germination is spread over several years. The seeds are dispersed by birds and mammals, including cattle, which eat the fruits, and buffalo may have been historically important dispersal agents of the seeds. Germinability apparently is enhanced by passage through the digestive tract of animals. Honey-locust also reproduces from stump and root sprouts.

Honey-locust is generally shade-intolerant and reproduction is primarily in open areas, gaps, and at the edges of woods. The ability of honey-locust to invade prairie and rangeland is thought to be related to its tolerance of xeric conditions. Growth is rapid and trees live to a maximum of about 125 years.

Management

The only serious disease of honey-locust is a canker, which is occasionally fatal, but trees in landscape plantings may be damaged by a number of pests and pathogens. Damage to young honey-locust also may be caused by rabbits gnawing the bark and by browsing of livestock and deer.

Honey-locust is easily injured by fire because of its thin bark, but it sprouts after top-kill by fire. It appears to be excluded from prairies by frequent fire. Infrequent fires may create openings for reproduction in bottomland forests. Honey-locust is not a nitrogen fixer.

Cultivars, Improved and Selected Materials (and area of origin)

Contact your local Natural Resources Conservation Service (formerly Soil Conservation Service) office for more information. Look in the phone book under "United States Government." The Natural Resources Conservation Service will be listed under the subheading "Department of Agriculture." These plant materials are readily available from commercial sources.

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Edited: 05dec00 jsp; 03feb03ahv

For more information about this and other plants, please contact your local NRCS field office or Conservation District, and visit the PLANTS Web site<http://plants.usda.gov> or the Plant Materials Program Web site <http://Plant-Materials.nrcs.usda.gov>

Century Products
The Leader In Hardscape Protection

CR-PE Multi-Purpose Root & Water Barrier Molded rolls :

Manufactured from durable polyethylene material, the CR-PE Roll first features a natural water barrier with integrated 90˚ flared root deflecting ribs preventing costly damage to both hardscapes and pavements from root and/or water damage. Reduces construction cost on materials for projects up to 50% over standard root barrier panels with maximum protection.

Linear Application: For root pruning of existing trees or in planting situations where one or more trees are in close proximity to hardscapes.
-OR-
Tree Well Application: For new tree planting or when the hardscape encircles the planter

FEATURES:

- Most versatile & advanced root barrier on the market today.
- Reduces cost by combining two products into one effective Water and Root barrier
- Prevents water from seeping under pavements & roadways
- Integrated 90˚ Flared root deflecting ribs; self interlocking connection.
- Ease of installation: ribs provide stabilization during installation

MD = Machine Direction
TD = Transverse Direction

SPECIFICATIONS (Polyethylene)

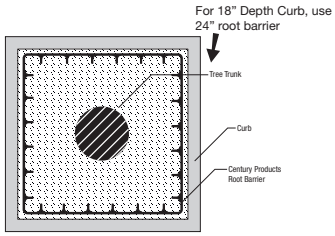
CR-PE Series: CR-PE12-20, CR-PE18-20, CR-PE24-20, CR-PE36-20.
Integrated & Flared root deflecting ribs with self interlocking connection.
Material: Polyethylene with ultraviolet inhibitors.
Thickness: 0.040" & 0.060"

MATERIAL	Polyethylene			
THICKNESS	0.040"		0.060"	
PROPERTIES	**ASTM TEST METHOD**	**VALUE POLYETHYLENE COPOLYMER (.040")**	**ASTM TEST METHOD**	**VALUE POLYETHYLENE COPOLYMER (.060")**
MD Break Strength (psi)	D638	4238 psi	D638	2950 psi
TD Break Strength	D638	3278 psi	D638	3463 psi
MD Break Elongation	D638	725%	D638	603%
TD Break Elongation	D638	607%	D638	676%
Puncture Strength	D4833	111 lbs.	D4833	158 lbs.
MD Tear Strength	D1004	46 lbs.	D1004	64 lbs.
TD Tear Strength	D1004	42 lbs.	D1004	60 lbs.
Hydrostatic Resistance (psi)	D75, Procedure A	403 psi	D75, Procedure A	615 psi
MULTI-AXIAL TENSILE PROPERTIES	D75, Procedure A			
Maximum Stress (psi)		1954 psi	D5617 Procedure A Centerpoint Deflection Verses Pressure	1954 psi
% Elongation @ Rupture		31.1%	D5617 Procedure A Centerpoint Deflection Verses Pressure	31.1%

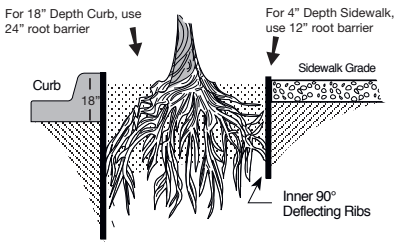
U.S. Standard
For Technical or Field Support, please call: (714) 632-7083

Tolerances may vary in order to maintain the integrity of post-consumer materials, and assure the material structure. We make no other warranties, express or implied, and specifically disclaim the warranty of merchantability or fitness for a particular purpose.

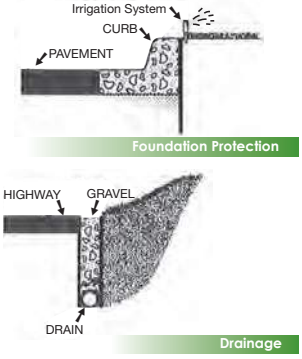
TREE WELL APPLICATION



LINEAR APPLICATION



DUAL PURPOSE WATER/BARRIER



* If planting adjacent curb, gutter & sidewalk, 24" material is recommended to contain roots.

CR-PE SERIES Dual Purpose Water/*Root Barrier Molded Rolls*

Century Products
The Leader In Hardscape Protection

The **Century CR-PE Series Dual Purpose Water/Root Barrier Molded Rolls** are manufactured in 20' segments with integrated 90° flared root deflecting ribs; also available in custom lengths up to 100' with a flexible top safety edge for pedestrian safety. The barrier is cut to specified height (12" to 48") and installed in a linear application directly along the hardscape or cut to length as needed tree well applications. The ends are connected using the self-connecting molded rib. Use staples, friction fit, Century tape or equal, to secure connection.

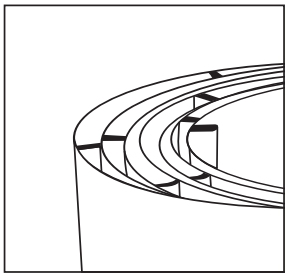


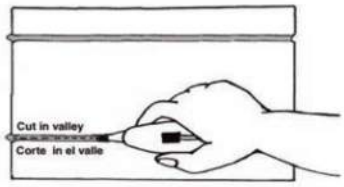
Fig. 2

I. SPECIFICATIONS

A. The Dual Purpose barrier shall be **CR-PE Series** manufactured by Century Products, 1144 N. Grove Street, Anaheim, CA 92806, (714) 632-7083 or approved equivalent.

B. The barriers are black molded root barrier rolls manufactured from recycled polyethylene plastic with ultraviolet inhibitors. Available in 0.040" (1.02 mm) & .0060" (1.52 mm) thickness.

C. Barriers available in standard 20' lengths and up to 100' various depths (12" to 48") as specified. Each roll shall have vertical integrated 90° flared root deflecting ribs protruding ½"-¾" from wall and placed 6-8" apart. A root impervious molded self-connecting end provides easy assembly using staples, friction fit, Century sealant tape, or equal.



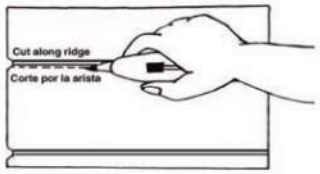


Fig. 3

II. INSTALLATION

A. Cut desired length of molded roll material and install directly alongside hardscapes for linear planting or install continuous piece contouring the tree well/planter.

B. Connecting: For use when utilizing as a **dual purpose water/root barrier** or tree well application. Connect the ends by overlapping two 6" (15 cm) sections with the leading rib cut directly down the middle and join with staples, friction fit, Century sealant tape or equal: See figure 2 & 3.

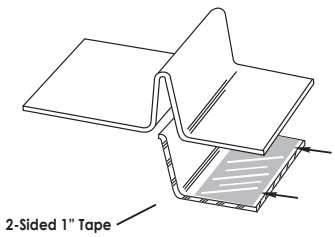
C. When necessary use an umbrella Cement nail to tack up barrier **** must be used above grade or water line.

D. Vertical integrated 90° flared root deflecting ribs are always facing the root ball.

E. Install the root barriers 1-2" above the grade to prevent root penetration above the barrier. (When adjacent to concrete, top of root barrier Must be at least 1/2" above Grade) Prepare your installation as shown in the illustrations. (Assemble barrier as shown in fig. 3)

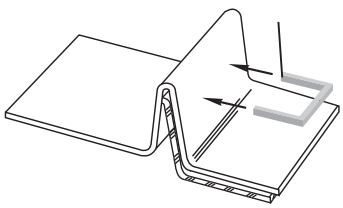
F. Recommended for linear or tree well applications. Back fill with existing native soil. If necessary for drainage, use gravel or crushed rock. Avoid backfill less than 3/4" or greater than 1 1/2". Finish to grade. Do not distort barrier during installation.

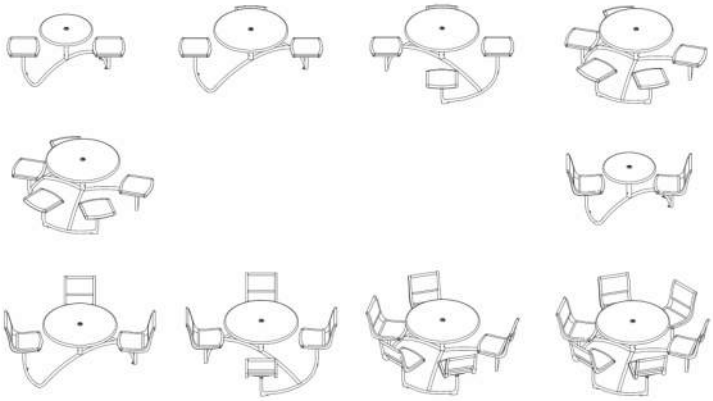
G. Technical Questions? Contact Century Products at 714. 632.7083 for assistance.



Staple or Tape

STAPLES 2" APART





Included components:

- Tabletop
- Table support
- Seats
- All 4, 5 and 6 seat surface mount units also have freestanding glides installed.
- Surface mount tabs are welded on all 2 and 3 seat units. These must be anchored.
- (4) 1/4-20 x 3/4" Phillips tapping screws for Catena or Steelhead tabletop
- (4) 1/4-20 x 5/8" Phillips machine screws with washers for Marneaux tabletop
- 3/8-16 x 3/4" set screw per seat (factory installed in seat stem)

Tools required:

- #3 Phillips screwdriver for attaching tabletop to support
- 3/16" hex key for installing seats

For Surface Mount units:

- Anchoring hardware not included for surface mount units. 2, 3 and 4 seat units require 4 anchor bolts. 5 seat unit requires 5 bolts. 6 seat unit requires 6 bolts. Powers Fasteners Power-Bolt® stainless steel 3/8" x 2-1/4" hex head sleeve anchors are recommended.
- Hammer drill with 3/8" diameter carbide tipped drill bit
- Hammer
- Wrench

Surface mount to be installed with helical screws. Product number to be provided by Landscape Architect.

ASSEMBLE WITH CARE! Pangard II® Polyester Powdercoat is a strong, long-lasting finish. To protect this finish during assembly, place unwrapped powdercoated parts on packaging foam or other non-marring surface. Do not place or slide powdercoated parts on concrete or other hard or textured surface – this will damage the finish causing rust to occur. Use touch-up paint on any gouges in the finish caused by assembly tools.

WARNING! TABLES WITH AN UMBRELLA MUST BE FASTENED SECURELY TO HARD SURFACING TO PREVENT TIPPING DUE TO WIND.

PROCEDURE FOR TABLETOP and SEAT INSTALLATION:

1. Lay tabletop upside down on a non-marring surface.
2. Place table support upside down on tabletop. Center support on top and align holes in support plate to threaded holes in the tabletop.
3. Install hardware. Tighten all table top fasteners until snug, then tighten additional 1/4 turn. **[The use of power drivers is not recommended with Marneaux tabletops. Threaded inserts may be damaged or broken due to over-torquing.]**
4. Turn table unit right side up, using at least 2 people.
5. Place stem on seat bottom into tube on table support. The pin in the stem fits into the groove inside the support tube. For backless seats, install with the head of the set screw closest to the table.
6. Turn set screw in until snug, then tighten an additional 1/4 turn.

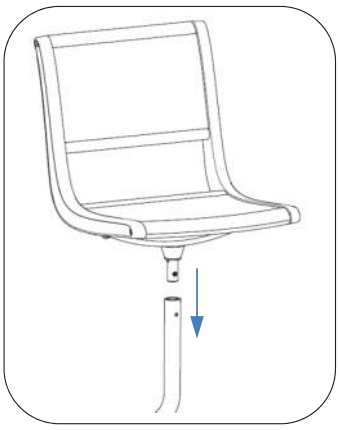


Fig. 1 – Install seat

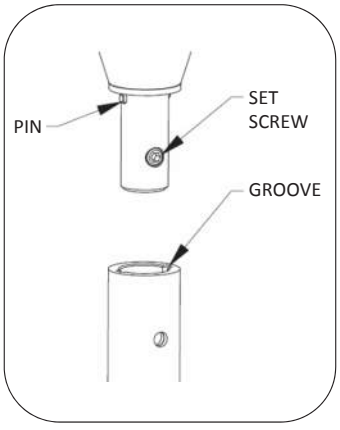


Fig. 2 – Seat stem detail

landscapeforms®

Mingle 2 and 3 seat units MUST BE ANCHORED. 4, 5 and 6 seat units specified with a non-collapsible umbrella MUST BE ANCHORED.

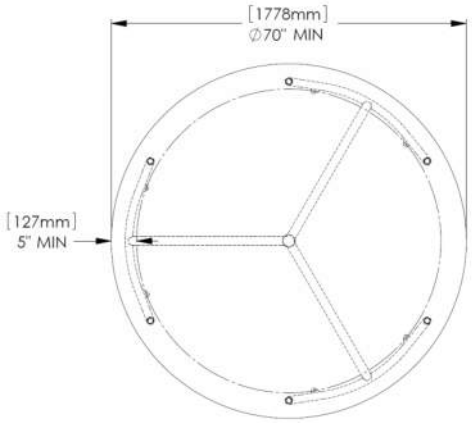
PROCEDURE FOR SURFACE MOUNT INSTALLATION:

Note: DO NOT DRAG unit across concrete or other rough surfaces. This could damage the powdercoat on the bottom of the surface mount plates. Minimum recommended concrete slab thickness is 3-1/2".

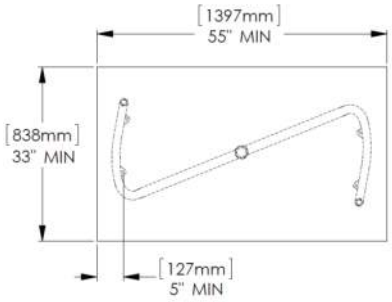
1. Place unit in desired position and mark anchor locations through holes provided in surface mount plates.
2. Move unit and drill holes.
3. Clear the holes of dust and debris using compressed air.
4. Place unit in desired position and install all of the anchors. After all anchors are installed, tighten as recommended by anchor manufacturer.
5. Periodically check fasteners and tighten if required.

PROCEDURE FOR UMBRELLA INSTALLATION:

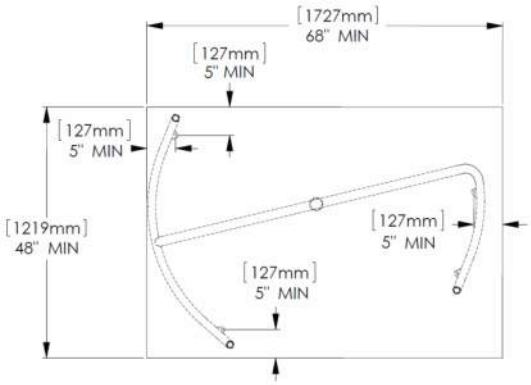
1. Insert umbrella grommet into hole in tabletop.
2. Install umbrella through hole in the grommet and into the table support tube.
3. Insert the 1/4-20 machine screw through hole in table support tube and secure with locknut.



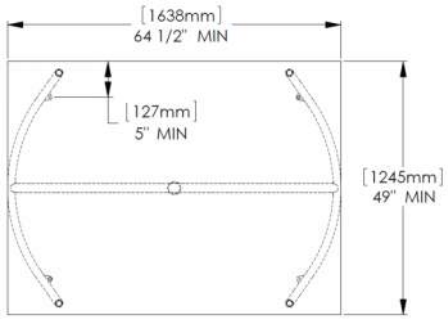
Recommended size for 3,4,5 or 6 seat unit



Recommended size for 2 seat unit



Minimum size for 3 seat unit



Minimum size for 4 seat unit

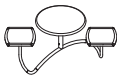
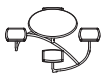
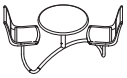
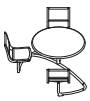
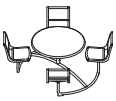
35 COLLECTION

Product Data Sheet




To Specify

1. Select Mingle table with backed or backless seats.
2. Select 2,3, 4, 5 or 6 seats.
3. Select table top: solid Steelhead, Catena in powdercoat or stainless steel, or Marneaux.
4. Specify with or without umbrella hole (may not be retrofitted).
5. Choose powdercoat color for metal parts or Marneaux color if applicable.
6. Specify freestanding with glides, or surface mount. Two-seat and three-seat styles must be surface mounted. See Shade mounting option for surface mount rules.

	STYLE	DIAMETER	HEIGHT	PRODUCT WEIGHT
	2-seat backless	67"	29"	204 lb*
	3-seat backless	82"	29"	283 lb*
	4-seat backless	82"	29"	315 lb*
	5-seat backless	82"	29"	348 lb*
	6-seat backless	82"	29"	381 lb*
	2-seat backed	73"	33"	211 lb*
	3-seat backed	87"	33"	294 lb*
	4-seat backed	87"	33"	329 lb*
	5-seat backed	87"	33"	366 lb*
	6-seat backed	87"	33"	403 lb*
MOUNTING OPTIONS				
 freestanding w/glides		 surface mount		

*Product weights vary based upon selected table material. For specific weights, please visit the online price list.

Landscape Forms, Inc. | 800.521.2546 | F 269.381.3455 | 7800 E. Michigan Ave., Kalamazoo, MI 49048

SITESCAPES

STADIUM SURFACE MOUNT

The Stadium backed surface mount chair features a pedestal base that allows for permanent installation. These chairs are perfect for sports venues, cafe patios, and outdoor beer gardens.

MATERIALS

- Seat Tubing - 7/8" Aluminum Tubing
- Seat Panel - 1/8" Aluminum perforated sheet
- Base Plate - 8" Sq. x 3/8" stainless steel plate
- Center post - 2 3/8" x .154 wall steel tubing
- Foot Ring - 5/8" Steel Rod
- Ring Support - 1/4" Steel Plate
- Mounting plate - 8" Sq. x 3/8" stainless steel plate

OPTIONS

Choose bar or dining height; powdercoat or Duracoat finish; and color.

-Chairs to be bar height, powdercoated black (see last image on second page)

SITESCAPES
www.sitescapesonline.com

Colorado product rep: Bud Marolt of G.R. Marolt & Associates, LLC
Office: 303-762-1090
Email: bmarolt@comcast.net

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Lincoln, NE 68542
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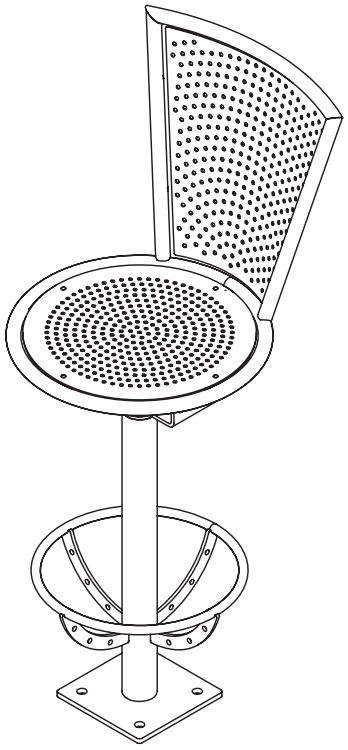
Colorado product rep: Bud Marolt of G.R. Marolt & Associates, LLC
Office: 303-762-1090
Email: bmarolt@comcast.net

TITLE	PRODUCT NO.	*INCH TOLERANCES U.O.S.*	
STADIUM BAR HEIGHT CHAIR	*ST5-1000*	FRACTION-- ±1/16" ANG---------- ±1˚	

*Available in powder coat and DuraCoat finishes



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Email: bmarolt@comcast.net

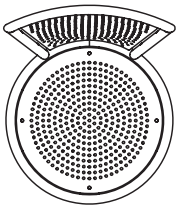
INCH TOLERANCES U.O.S.	FRACTION-- ±1/16" ANG---------- ±1°

TITLE
STADIUM BAR HEIGHT CHAIR

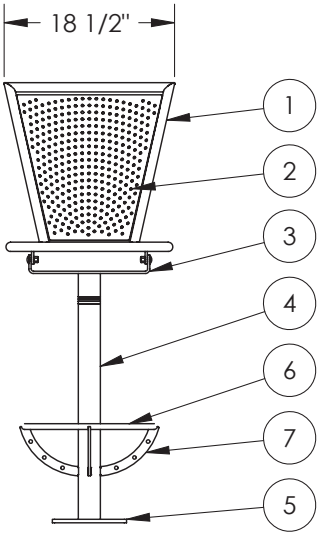
PRODUCT NO.
ST5-1000

*Available in powder coat and DuraCoat finishes

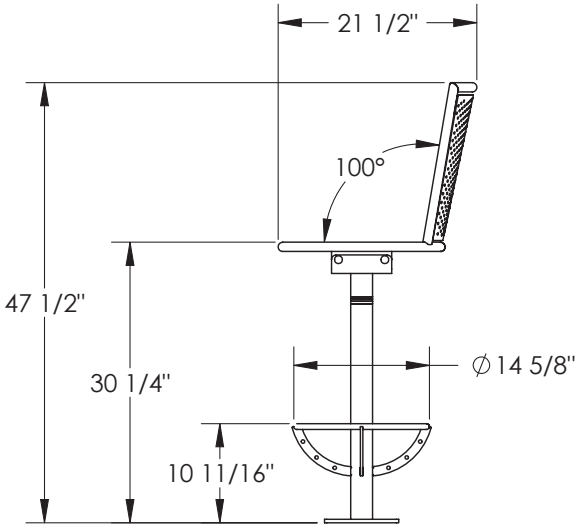
MATERIALS LIST:
(1) Seat Tubing - ∅7/8" Aluminum Tubing
(2) Seat Panel - 1/8" Aluminum Perforated Sheet
(3) Support Plate - 1/4" Steel Plate
(4) Pivoting Support Tubing - ∅2 3/8" Steel Tubing
(5) Base Plate - 8" Sq. x 3/8" Stainless Steel Plate
(6) Foot Ring - ∅5/8" Steel Rod
(7) Ring Support - 1/4" Steel Plate
(8) Mounted w/ Four ∅1/2" x 4-5" Stainless Steel Anchor Bolts (Customer Supplied)



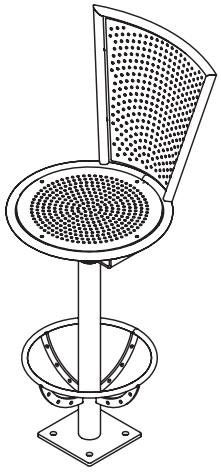
TOP VIEW



FRONT VIEW



RIGHT SIDE VIEW



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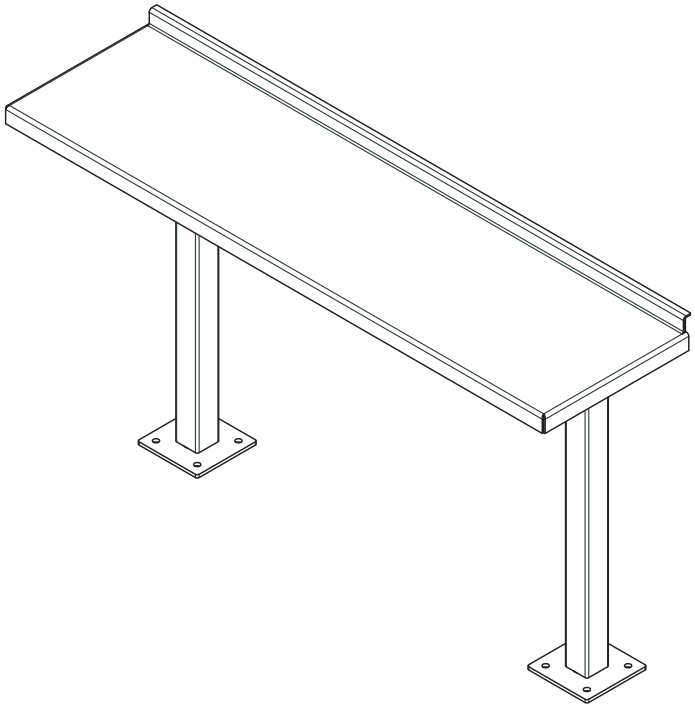
Email: bmarolt@comcast.net

TITLE	PRODUCT NO.	INCH TOLERANCES U.O.S.	
DRINK RAIL TABLE	*UL6-1000-BH*	FRACTION-- ±1/16" ANG---------- ±1˚	

*Available in powder coat and DuraCoat finishes



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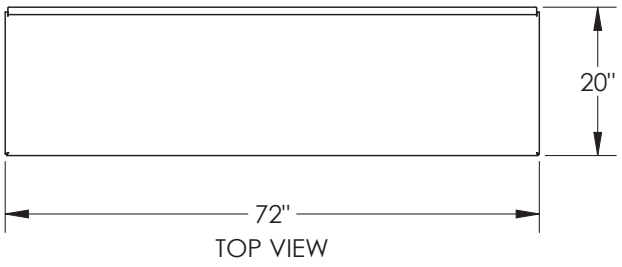
Email: bmarolt@comcast.net

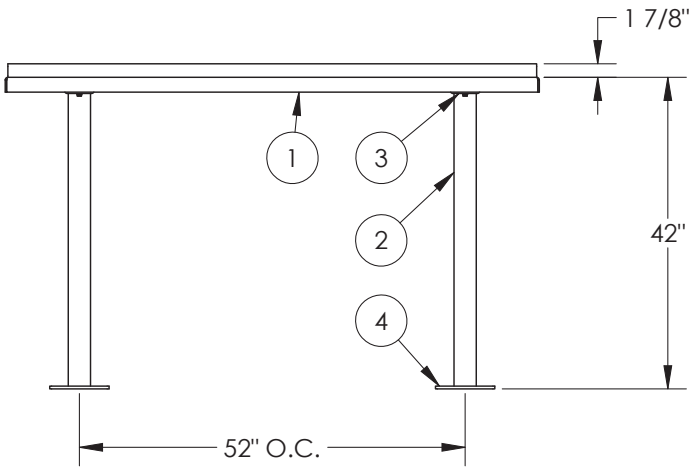
TITLE	PRODUCT NO.	INCH TOLERANCES U.O.S.	
DRINK RAIL TABLE	*UL6-1000-BH*	FRACTION-- ±1/16" ANG---------- ±1°	

*Available in powder coat and DuraCoat finishes

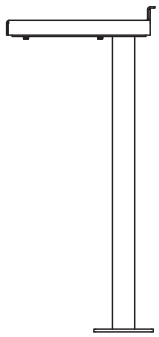
MATERIALS LIST:
(1) Table Top - 7 Gauge Stainless Steel
(2) Upright Tubes - 3" x 1/8" Wall Steel Tubing
(3) Table Top Supports - 7 Gauge Steel Plate
(4) Base Plate - 3/8" Stainless Steel Plate with 9/16" Mounting Holes
(5) Mounted with Four ∅1/2" x 4-5" Stainless Steel Anchor Bolts (Customer Supplied)

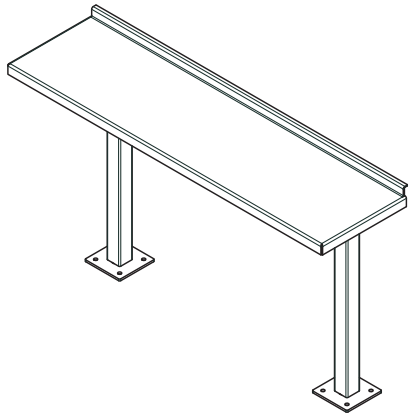


TOP VIEW



FRONT VIEW


RIGHT SIDE VIEW



The new **Heavy-Heavy Benches** are characterised by the diagonal lines that run along their back and seats. The FSC® W-Wood® used in these benches has a similar life expectancy to FSC® hardwood, but has a lower density and hardness. The colour of the wood is polychrome brown.

Heavy-Heavy Benches

NEW

HH-L-225
225x49x47 cm

HH-H-275-2BR
275x49x47cm

HH-H-325-2BR
325x70x47cm

Heavy-Heavy Benches are massive, heavy-duty benches created to reflect Streetlife's characteristic natural look. The heavy wooden beams are 15x21cm - 5.9"x8.2" in dimension and are available in two lengths: 250 - 98" and 325cm - 128". The beams are secured on galvanized or CorTen steel cross-beam supports using the Streetlock® system.

The W-Wood® used in the Heavy-Heavy Benches is European FSC® pine made extremely durable through a process of deep treatment with a natural wax compound. The water-resistant properties of W-Wood® mean these benches are extremely long-lasting and are guaranteed to remain in top condition for the next 15 years. W-Wood® has a similar life expectancy to FSC® hardwood, but has a lower density and hardness. Just like hardwood, the polychrome honey brown will fade very gradually to a greyer tone (over a period of about 3 years).

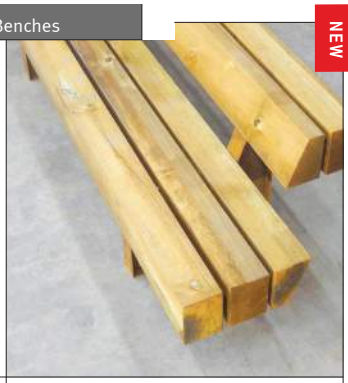
The backrests are multifunctional and can be used as lean-supports, seating, table tops, etc. The backrests can be linked together just like the benches in order to create a longer piece.

Heavy-Heavy Benches

NEW

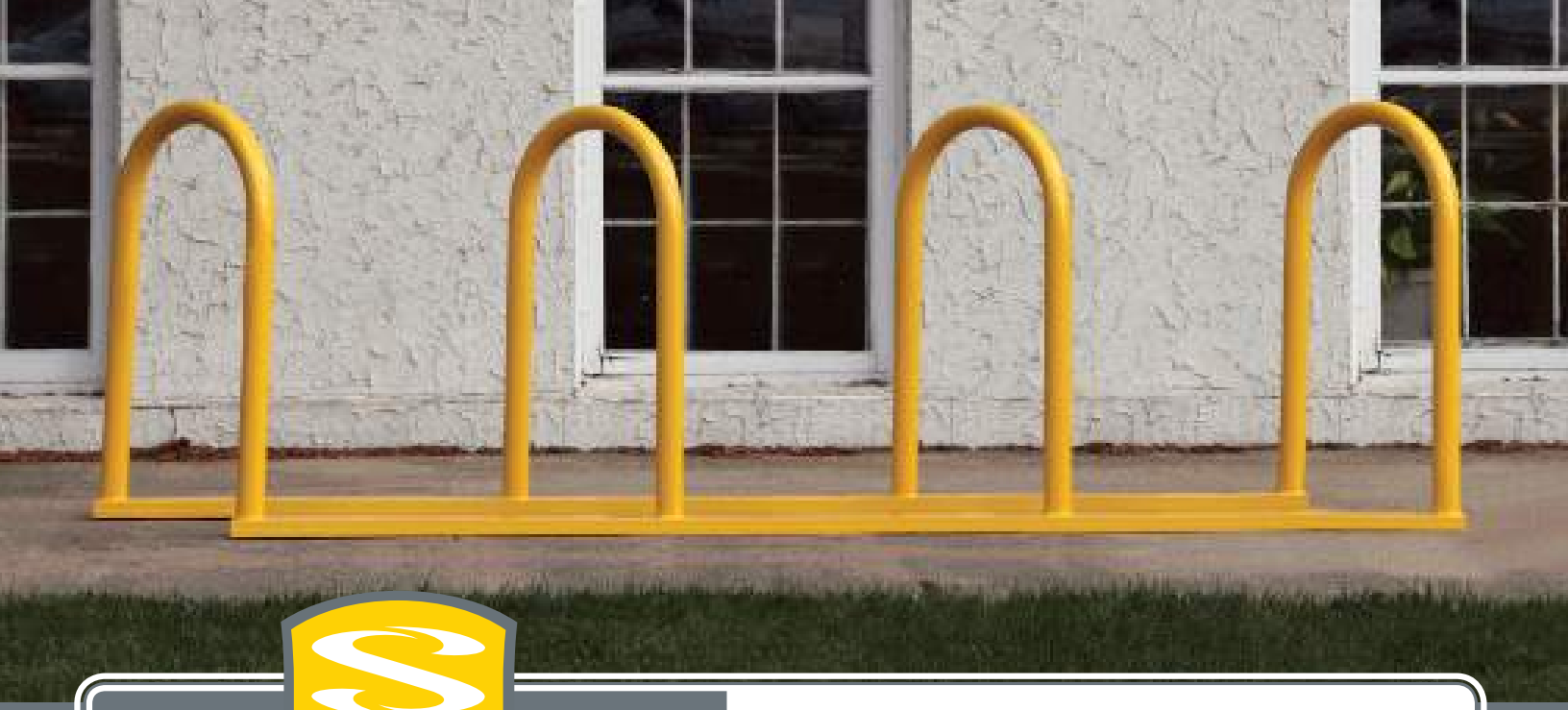
Heavy-Heavy Benches are massive, heavy-duty benches created to reflect Streetlife's characteristic natural look. The heavy wooden beams are 15x21cm - 5.9"x8.2" in dimension and are available in two lengths: 250cm - 98" and 325cm - 128". The beams are secured on galvanized steel or CorTen cross-beam supports using the Streetlock® system.

The backrest models are multifunctional and can be used as lean-supports, seating, table tops, etc. The backrests can be linked together just like the benches in order to create a longer piece.



HH-H-D-325-2BR
325x140x47cm

The W-Wood® used in the Heavy-Heavy Benches is European FSC® pine made extremely durable through a process of deep treatment with a natural wax compound. The water-resistant properties of W-Wood® mean these benches are extremely long-lasting and are guaranteed to remain in top condition for the next 15 years. W-Wood® has a similar life expectancy to FSC® hardwood, but has a lower density and hardness. Just like hardwood, the polychrome honey brown will fade very gradually to a greyer tone (over a period of about 3 years).



CYCLE RACKS

SARIS

STADIUM RACK

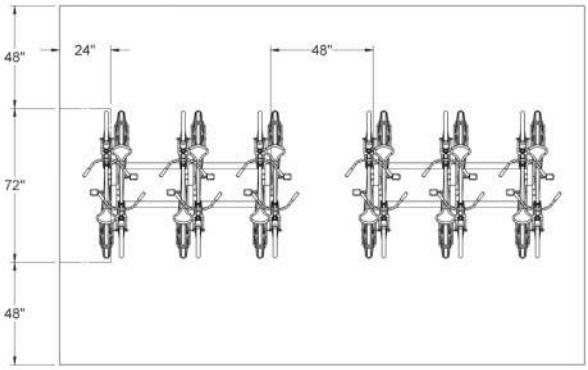
The stadium rack combines the intuitive ease of bike docks, with the benefit of reduced installation from a multi-space rack. Modular in nature, the stadium racks can be connected and expanded to fit the given installation area. The stadium racks meets APBP guidelines for u-lock compatibility, bike spacing and providing two points of support for the bike.

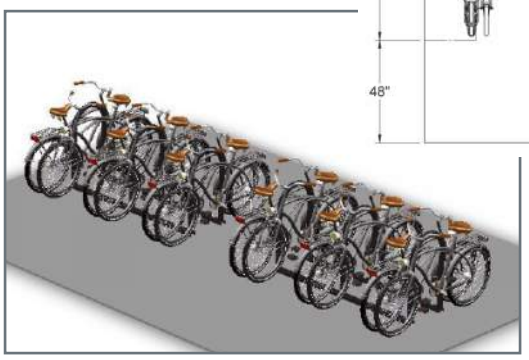
Specifications -2 3/8'' schedule 40 steel pipe, 9 gauge							
Model #	# Bikes	Type of mount	weight	length	width	height	Space Requirement
2136	6	Freestand	154 lbs.	75"	21"	37.2"	146.75" x 72"
2138	8	Freestand	190 lbs.	110"	21"	37.2"	158.00" x 72"

Note: Saris Parking Systems representatives can assist with custom layout and spacing to meet your room dimensions and desired bike capacity.

Stadium Rack

Recommended Spacing





Product Information
Saris Stadium Rack as manufactured by Saris

# of Bikes
Varies from 6 bikes and up

Materials
2 3/8" round tube
3" x 1 1/2" c-channel

Finish
Powder Coat
Galvanized
Thermoplastic

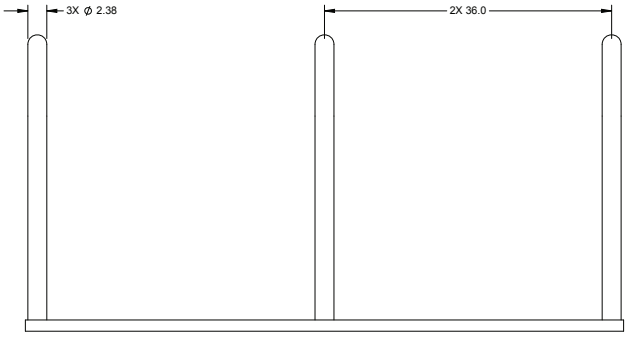
Hardware
Can be freestanding or use recommended anchor: #6259 for concrete installation
#6267 for asphalt installation

Spacing
24" from wall or curb
48" recommended between racks

Anchors must be purchased separately

Product Details

- Heavy duty, 2 3/8" outer diameter 9 gauge schedule 40 pipe
- No anchoring or assembly required, though anchoring holes are provided



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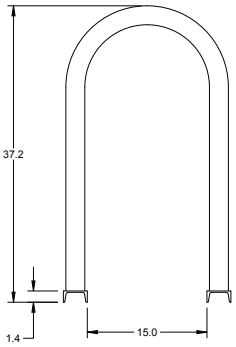
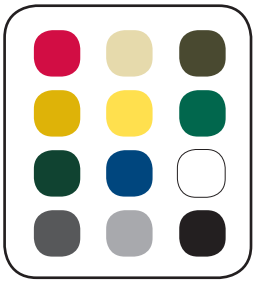
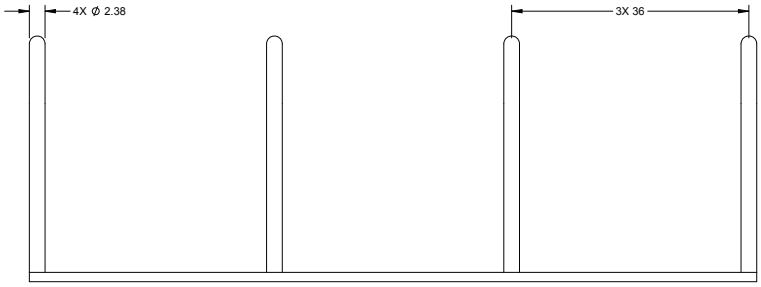




Standard Colors



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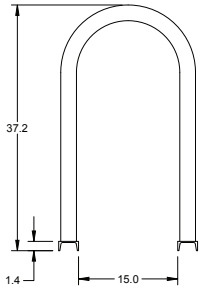
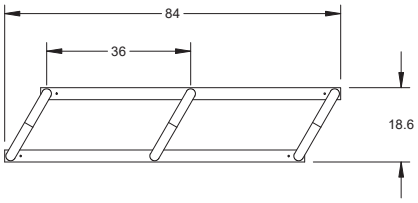
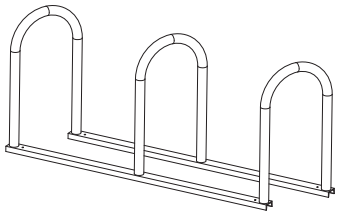
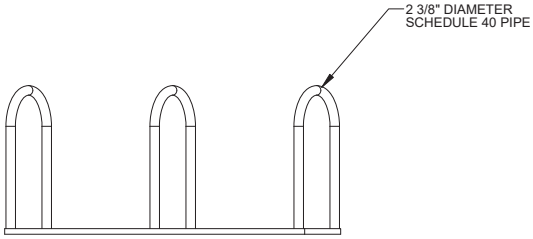


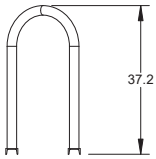
Downloadable product resources available online:

CAD Files
SketchUp Files
Written Specs
Photos









NOTE:

1. DO NOT SCALE DRAWING
2. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS
3. TOTAL WEIGHT: 138 LBS
4. SPECIFICATIONS ARE SUBJECT TO CHANGE

SARIS CYCLING GROUP

WE BRING CYCLING TO LIFE

SARIS CYCLING GROUP

5253 VERONA RD., MADISON WI. 53711
1-800-783-7257 / 1-608-274-6550
WWW.SARIS.COM WWW.CYCLEOPS.COM

TITLE:
2137 - 6 BIKE ANGLED STADIUM RACK

Pilot Rock®
PARK · STREET · CAMP
SITE PRODUCTS

Model BPRT2-72 and BPRT3-108 Multiple Module Bear Resistant Trash and Recycling Receptacle

SPECIFICATION BULLETIN
#SPC-TR-035
REV. 12-16

Model BPRT3/CU-108
Three Module Bear Proof Trash Receptacle with blue textured powder coat finish.

Model BPRT2/CN-72
Two Module Bear Proof Trash Receptacle with green power coat finish.

- **12 ga., 14 ga., and 7 ga. steel construction**
- **Tight fitting doors and lids, covered lid and door latches designed to prevent bears from getting inside**
- **Reinforced doors on full-length hinge**
- **Lids and door are self-latching**
- **Includes rigid plastic liners and anchor kit**
- **Optional recycling insert plates**

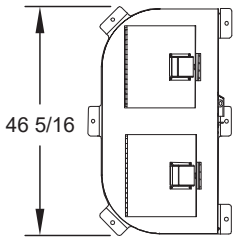
AVAILABLE OPTIONS

Choice of colors of textured powder coat finish
Recycling insert plate with choice of three sizes of hole

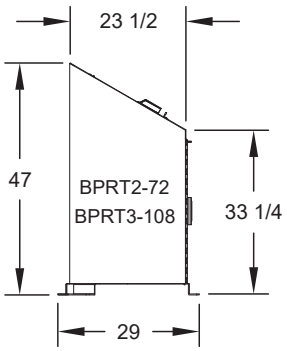
SPECIFICATIONS:

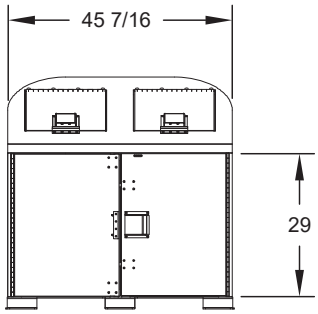
- **BPRT Series** bear resistant trash receptacle is designed and tested to keep bears out of your trash and recyclables.
- **Model BPRT2-72** has two hatches and two front doors and holds two included 36 gallon rigid liners. Dimensions: 46-5/16" wide, 47" tall, 29" deep.
- **Model BPRT3-108** has three hatches and two front doors and holds three included 36 gallon rigid liners. Dimensions: 68-5/16" wide, 47 tall, 29" deep.
- Receptacle meets ADA guidelines for forward and side reach.
- The receptacle features tightly fitted, self-closing hatches for depositing trash, and front access doors for removing the liners.
- Welded construction of 12 and 14 ga. formed steel shell reinforced with 1" x 1"x 18 ga. wall square tubing supports, welded to a 7 ga. base with six 25/32" dia holes for anchors. Anchor kit #ANC5-6 (six 1/2" x 5" concrete screw anchors) is included. Receptacle must be anchored to be considered "Bear Proof."
- Top is sloped for easy access to the 16" square hatch openings. The hatch is secured by a hinge and a self-closing commercial duty latch, mounted under a formed steel guard designed to fit human hands, not bear paws. Access for bears is also blocked by a raised obstacle built into the top of the receptacle.
- The front doors are 29" tall x 44" combined width for easy access to liners. Doors are 12 ga. steel mounted on a full length continuous hinge. Two self-closing latches secure each door at the top and bottom. A total of four latch points keep doors secure.
- Entire unit is finished in textured Brown powder coat paint.
- 36 gallon rigid plastic liners for each module are included.
- Trash or recycling decals are included, green on white vinyl self-adhesive, choice of design. Please specify when ordering.
- **Optional:** Choices of colors of textured powder coat finish. Available in green, black, or blue.
- **Optional:** Recycling insert plates finished in black powder coat. Available sizes are:
  Model BPRP PC1, 3" Dia. hole.
  Model BPRP PC5, 4-3/8" Dia. hole.
  Model BPRP PC6, 5-7/8" Dia. hole.
- Our Bear Proof Trash and Recycling Receptacles have been successfully tested by the Living With Wildlife Foundation (LWWF) and the Grizzly and Wolf Discovery Center (GWDC) using the Interagency Grizzly Bear Committee (IGBC) protocol.

RJ Thomas Mfg. Co., Inc.
PO Box 946 • Cherokee, IA 51012-0946 • PH: 712-225-5115 • 800-762-5002 • FAX: 712-225-5796
E-mail: pilotrock@rjthomas.com • Web Site: http://www.pilotrock.com



BPRT2-72





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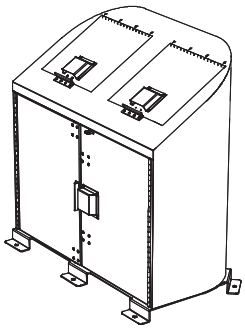

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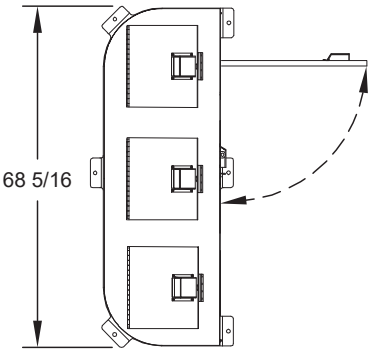

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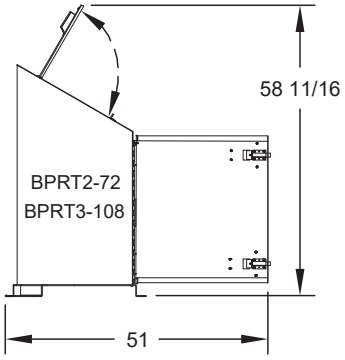

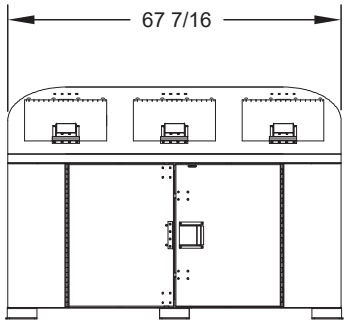

BPRT3-108

ALL DIMENSIONS IN INCHES

RJThomas Mfg. Co., Inc. P.O. Box 946 • Cherokee, IA 51012-0946	DRAWN BY MFI	TITLE MODELS BPRT2-72 AND BPRT3-108 BEAR PROOF TRASH RECEPTACLES SHOWN WITH INCLUDED RIGID PLASTIC LINERS	DATE 3-29-16 DWG. NO. AI-2014

Specification Bulletin SPC-TR-029

Colorado Outdoor Environments, Inc.
PO Box 513
Carbondale, CO 81623
(970) 925-2969

IRRIGATION SYSTEM SPECIFICATIONS
GLENWOOD SPRINGS – 7th Street Project

PART 1 - GENERAL

1.1 SUMMARY

A. Provide irrigation installation where shown on the Drawings, and as specified herein, complete in place, tested and approved. It is the responsibility of the installation contractor to verify plans and quantities for correctness. Notify COE of any differences between the plans and site conditions immediately for review.

1.3 WARRANTY

A. System to be under warranty for one year, after final acceptance of project. Items included in the warranty include but are not limited to double coverage, dry spots, proper functioning of control boxes, control clock, all irrigation heads, emitters, all valves and quick couplers and remaining components for proper operation.

1.4 QUALITY ASSURANCE

A. Subcontract irrigation work to a single firm specializing in irrigation installations for quality and warranties.
B. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Ensure no parts or components are damaged during delivery. Store materials in a location out of the way of current construction and vehicular traffic. Materials shall be stored in a way to guarantee that the products do not deteriorate or become damaged.

PART 2 – PRODUCTS

2.0 SUBSTITUTIONS

A. Substitutions for equivalent materials will be reviewed when submitted in writing to the following entities.

a. Colorado Outdoor Environments – Peer Erickson – peer@coeaspen.com
b. Landscape Architect – Shannon Murphy - shannon@shannonmurphy.net
c. City of Glenwood Springs Parks Department – Nate Mohrmann - nate.mohrmann@cogs.us

B. After review by the above parties Colorado Outdoor Environments will reply in writing weather the substitution is approved or not approved.

2.1 PIPE

A. Mainline pipe: Use schedule 40 polyvinyl chloride, marked 1120-1220, and bearing the seal of the National Sanitation Foundation.
B. Laterals: Use 80# Poly pipe.
C. Fittings: Use schedule 40 polyvinyl chloride, type I-II, bearing the seal of the National Sanitation Foundation, and complying with ASTM D2466.
D. For joining: 1. Use a solvent complying with ASTM D2466 and recommended by the manufacturer of the approved pipe. Glue and Primer must be approved by the City of Glenwood Springs Parks Department and installed in a controlled environment. 2. For poly. pipe use Otiker pinch clamps. Gear clams are not acceptable.
E. Plastic Pipe Identification: Continuously and permanently mark with manufacturer's name, pipe size, schedule number, type of material, and code number.

2.4 REMOTE CONTROL VALVES

A. Automatic valves for sprinkler heads shall be Rain Bird PEB-100 as drawn.
B. Automatic valves for drip zones shall be Rain Bird XCZ-100-PRB-COM.
C. All valves shall be installed in standard valve boxes with 2-3” gravel in the bottom.

2.5 SPRINKLER HEADS

A. Heads shall be 12” pop-up sprays.

2.6 DRIP SYSTEM

A. Drip system for trees/shrubs shall be ¾” dripline. Drip existing trees and planted trees in the scope of work. Dwarf Spruce will not require drip irrigation if inside a planting bed.
B. Dripline shall circle trees the same diameter as the root ball and then continue to the next tree or shrub. Space emitters equally around the tree.
C. Installer shall use 2 GPH Xeri-Bug Emitters for trees and shrubs.
   ~~a. 5-gallon shrubs 1~~
   ~~b. 10-gallon shrubs 3~~
   ~~c. 15-gallon shrubs 4~~
   d. 1”-2” caliper trees 3
   e. 2”-3” caliper trees 4
   f. 3” caliper or more. 5+
   ~~g. 6’ or less evergreen 3~~
   ~~h. 6’-10” evergreen 4~~
   ~~i. 10’-15’ evergreen 5~~

j. ~~15' or above evergreen 6+~~

D. 1 drip valve has been centrally placed to cover all trees. Installer shall design layout of dripline from valve to all trees. Dripline inside planting beds shall follow the same path and depth of the lateral irrigation lines. Bury dripline between trees a minimum of 12" between top of pipe and finished grade. Bring dripline to surface at each tree/shrub. Stake dripline to ground and cover with mulch as directed by Landscape Architect so pipe is not visible.
E. Layout shall be approved by Landscape Architect and COE before final installation.

2.7 IRRIGATION TAPS

A. A 1.5" tap has been provided as shown on plans. Verify location with City staff.

2.8 AUTOMATIC IRRIGATION CLOCK

A. Use existing RME Eagle Controller – across the street from the Grind near the exterior transformer. Verify with City Staff.
B. Irrigation wiring conduit shall run from clock to box on North side of 7th Street in front of Utility Building. From there the conduit runs to the POC location. See drawing Utilities#2. Verify with City Staff.
C. A Rain/Freeze sensor shall be installed near the clock and away from any obstructions that would limit the devices effectiveness. Install if not present.
D. Lightening/Surge Protector is required per the clock manufacturers specifications. Verify this was completed with City Staff.

2.9 ISOLATION VALVES

A. Provide Lasco TUBV-SV True Union Ball Valve with 12" Standard Valve Box as drawn equal to size of pipe.

2.10 SLEEVES

A. Sleeves under roadway and sidewalks <u>should</u> be installed by Contractor building the street, <u>verify this is the case</u>. Inform COE immediately if this is not the case. It is the responsibility of the landscape/irrigation contractor to install sleeves in the sand set granite areas. Verify all locations match plans and depths are 18" below final grade. Notify COE of any differences between the plans and site conditions immediately for review.
B. All sleeves to be 2 times the diameter of the pipe to be sleeved. If multiple pipes are going through the sleeve the sleeve diameter shall be 2X the total diameters of the pipes using the sleeve.
C. All main line sleeves shall have an additional 4" sleeve for control wires.
D. Minimum pipe sleeve size is 4".

2.12 VALVE BOXES

A. Valves, water meters, filters, etc. shall be installed in either Standard or Jumbo valve boxes.
B. 6" Round valve boxes shall not be used.

C. 10” Round valve boxes shall only be used for quick couplers.

2.13 BACKFLOW PREVENTER

A. A backflow preventer will not be required as the mainline you will tap into already has a backflow preventer. Verify with City Staff.

2.14 QUICK COUPLER VALVE

A. Provide a Quick Coupler Valve (RainBird 33 DLRC) in each planting/irrigation area for a total of 8 (eight). City staff to select locations with COE and Landscape Architect.

2.15 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Irrigation Designer (Colorado Outdoor Environments, Inc.).

PART 3 - EXECUTION

3.1 DESIGN EXECUTION:

A. The irrigation system shall employ the following specifications:
    1. Source of Water: Tap, per the City of Glenwood Springs, is estimated to provide 50+ GPM and 125+ PSI. COE designed using 45 PSI at 4-26+/- GPM. PSI and GPM to be verified in the field once construction allows. Notify COE if PSI and GPM are not as stated above.
    2. Meet local code requirements.
    3. Mainline to be installed 18” below finished grade, and laterals 12” below grade. Schedule 40 PVC for mainlines.
    4. Laterals 80# Poly. pipe.
    5. The irrigation clock shall be located near the Grand Ave. bridge (near Smoke Restaurant). Verify availability with City Staff.
    6. Valve box/s locations to be approved by the Landscape & Irrigation Designer.
    7. All trees and shrubs should be drip irrigated.
    8. The lawn areas shall be irrigated with Rain Bird 1800 Pop-Up heads as shown on the plans.
    9. Areas within close proximity to the building shall be irrigated with small radius pop-up heads ensuring double coverage and NOT rotors.
    10. Double coverage should be provided.
    11. Overspray should be minimized so not to occur on paved areas or building structures. Adjustment of heads will be required to achieve this.
    12. Available water pressure is to be confirmed in the field.
    13. Electrical connection shall be verified in the field.
    14. Locate all sleeving required under hardscape areas as described in section 2.10.

3.2 INSPECTION:

A. Submit and review design plans with Irrigation Designer, Colorado Outdoor Environments, Inc. and the City of Glenwood Spring Parks Department before beginning work.

3.3 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.4 FIELD MEASUREMENTS

A. Make necessary measurements in the field to ensure correct design parameters and to ensure precise fit of items in accordance with the approved design. It is the responsibility of the installation contractor to verify plans and quantities for correctness.

3.5 TRENCHING AND BACKFILLING

A. Trench, backfill, and compact to 95% compaction.
B. Pipes shall be bedded with clean topsoil with rocks of equal to or less than ¾" for a minimum of 4" of cover over the pipe. Once proper bedding cover and compaction is established backfill of native soil is acceptable as long as no rocks over 4" are put into the trench.

3.6 INSTALLATION OF PIPING

A. General:
   1. Lay out the piping system in accordance with arrangement shown on the approved Design Drawings.
   2. If piping is shown on the Design Drawings to be under paved areas but running parallel and adjacent to planted areas, the intention is to install the piping in the planted areas.
   3. If piping is shown on the Design Drawings to be under paved areas but running perpendicular to the paved area, provide sleeving as outlined in this section.
   4. If piping is shown on the design drawings running parallel with other irrigation pipe, they can be placed in a single trench provided the pipe is separated by no less than 6".

B. Piping depth: Install piping with at least the following depth:
   1. Mainlines: 18" below finished grade or 5X the pipe diameter, whichever is greater.
   2. Laterals: 12" below finished grade or 5X the pipe diameter, whichever is greater.
   3. PVC Sleeves beneath paved areas: 18" below finished grade and extend 12" past paved area edges. Provide a 90-degree elbow on each sleeve end and add additional length of same pipe size to extend above finished grade by 12" until sleeve is used. Cap pipes using PVC caps.

C. Inspection of materials:
   1. Carefully inspect pipe and fittings before installation, removing all dirt, scale, and burrs; and reaming as required.
   2. Install pipe with markings side facing up for visual inspection.

D. Plastic pipe:
    1. Exercise care in handling, loading, unloading, and storing plastic pipe and fittings:
        a. Store under cover until ready to install.
        b. Transport only on a vehicle with a bed long enough to allow the pipe to lay flat to avoid undue bending and concentrated external load.
    2. Repair dented and damaged pipe by cutting out and discarding the dented or damaged section and rejoining with a coupling.
    3. In jointing, use only the specified glue and primer and make joints in accordance with the manufacturer's recommendations as approved by the Irrigation Designer.
        a. Give solvent welds at least 15 minutes set-up time before moving or handling, and 24 hours curing time before filling with water.
        b. For sealing threads, Teflon tape is NOT acceptable. Rectorseal or Weldon pipe thread paste that does not harden is acceptable.
    4. Centerload plastic pipe with a small amount of backfill to prevent arching and whipping under pressure.
    5. For plastic-to-steel connections:
        a. Work the steel connections first;
        b. Use a non-hardening pipe dope on threaded plastic-to-steel connections.
        c. Use only light wrench pressure.

E. Control Wires:
    1. Control wires shall be routed with the main line and attached every 24” increments with plastic wire ties or duct tape. Wires shall be located away from the mainline by at least 6”.
    2. If splicing of wiring is necessary permanent wire splices shall be located in a valve box at least 10 inches round or larger with enough extra wire so it reaches a minimum of 3’ outside the valve box.
    3. Wiring shall be 14 gauge or larger.
    4. Standard wiring shall be used: A white common wire shall be installed from each valve box (home run – no splicing of wire) to the clock. A red wire shall be installed from each valve (home run – no splicing of wire) to the clock. An extra yellow “Spare” wire shall be installed from each valve box (home run – no splicing of wire) to the clock.

3.7 INSTALLATION OF EQUIPMENT

A. Control Valves:
    1. Install automatic valves where indicated on the approved Design Drawings and in accordance with the manufacturer's recommendations as approved by the Irrigation Designer.

B. Turf sprinkler heads:
    1. Install where indicated on the approved Design Drawings and in accordance with the manufacturer's recommendations as approved by the Irrigation Designer.
    2. Set heads 1/2” above grade except along walks and driveways where finished grade is established. Set heads flush with surface of pavement at time of installation, and next to pavement.
    3. <u>Installation of irrigation head locations are critical to minimize overspray onto hard surfaces. Head layout shall be reviewed and approved by the City of Glenwood Springs Parks Department and Colorado Outdoor Environments before installation begins.</u>

C. Plant Material spray heads:

1. Install where indicated on the approved Design Drawings and in accordance with the manufacturer's recommendations as approved by the Irrigation Designer.
2. Set tops of heads ½" above finished grade.
3. Set heads along curbs flush with top surface of curb.
4. Installation of irrigation head locations are critical to minimize overspray onto hard surfaces. Head layout shall be reviewed and approved before installation begins by the City of Glenwood Springs Parks Department and Colorado Outdoor Environments.

3.8 TESTING AND INSPECTING

A. Do not allow or cause any of the work of this Section to be covered up or enclosed until it has been inspected, tested, and approved by the Irrigation Designer.
B. Before backfilling the main line, and with control valves in place but before lateral pipes are connected, completely flush and test the main line.
   1. Repair leaks.
   2. Flush out each section of lateral pipe before sprinkler heads are attached.
C. Testing:
   1. Make necessary provision for thoroughly bleeding the line of air and debris.
   2. Before testing, fill the line with water for a period of at least 24 hours.
   3. After valves have been installed, test live water lines for leaks at the required pressure for a period of two hours, with couplings exposed and with pipe sections centerloaded.
   4. Provide required testing equipment and personnel.
   5. Repair leaks, and retest until acceptance by the Irrigation Designer.
D. Final inspection:
   1. Clean, adjust, and balance all systems. Verify that:
      a. Remote control valves are properly balanced;
      b. Heads are properly adjusted for radius and arc of coverage;
      c. The installed system is workable, clean, and efficient.

3.9 INSTRUCTIONS

A. Attach a typewritten legend inside each controller door, stating the areas covered by each remote-control valve. Also include a map of the zone areas and major components.
B. After the system has been completed, inspected, and approved, instruct the City of Glenwood Springs Parks Department in the operation and maintenance of the system.
C. Provide an As-Built of the irrigation system. The plan needs to be reproducible in black and white. Provide a copy to the client, Maintenance Company, general contractor and irrigation designer. The irrigation as-built should include the following information, which may be written on a separate form:
   1. Source of water.
   2. Dynamic Pressure: ____PSI at 25 GPM.
   3. Zones and their locations.
   4. Types of heads on each zone.
   5. Water usage for each zone.
   6. Clock type, location and schedule.
   7. Pump type, location and size if applicable.
   8. Booster pump type, location and size if applicable.

9. Storage tank type, location and size if applicable.
10. Backflow preventer type, location and size if applicable.
11. Where the main line exits the building, if applicable.
12. Irrigation contractor name, address, phone number, and person knowledgeable about installation and use.
13. Irrigation designer information: Colorado Outdoor Environments, Inc., Contact: Peer Erickson, PO Box 513, Carbondale, CO 81623, (970) 618-7005.
14. General Contractor contact information including superintendent familiar with system.

4.0 TRAFFIC & SITE CONTROL

A. Traffic control is the responsibility of the Contractor. The plan is to be reviewed and approved by the City of Glenwood Springs before work begins to minimize traffic delays and ensure pedestrian access to the site and surrounding area.
B. Installation contractor shall keep the site neat, orderly, clean and free of debris during the entire installation process.

END OF SECTION